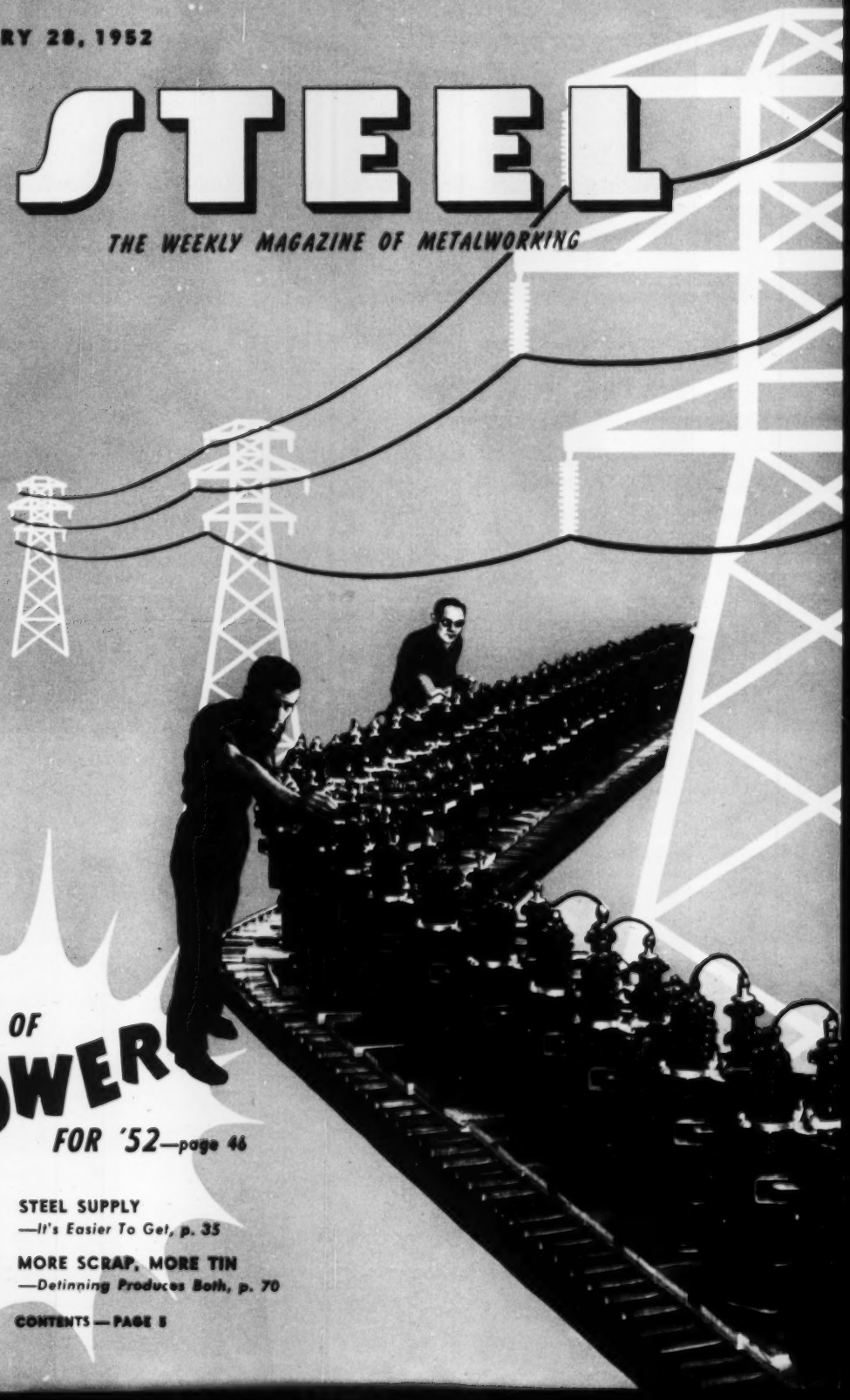
JANUARY 28, 1952

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

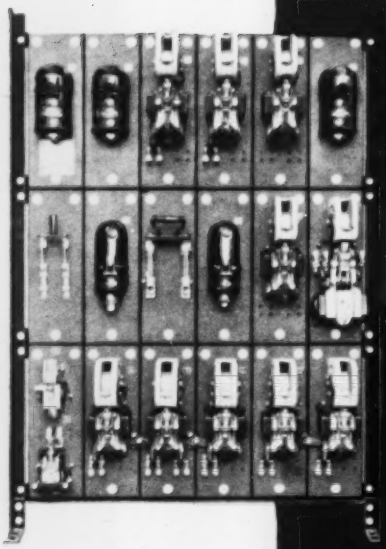


SURGE OF POWER FOR '52—page 46

STEEL SUPPLY
—It's Easier To Get, p. 35

MORE SCRAP, MORE TIN
—Detinning Produces Both, p. 70

CONTENTS—PAGE 5



LOOK for these NAMES when buying Motor Control

1 LINE-ARC Contactors
2 TIME-CURRENT Acceleration (D-c)
3 FREQUENCY RELAY Acceleration (A-c)
4 WRIGHT CIRCUIT Hoist Control (D-c)
5 YOUNGSTOWN Hoist Limit Stops
6 TYPE WB Brakes
7 CAM Master Switches
8 MANUAL-MAGNETIC Disconnect Switches
9 CONTRA-TORQUE Hoist Control (A-c)
10 TAB-WELD Resistors

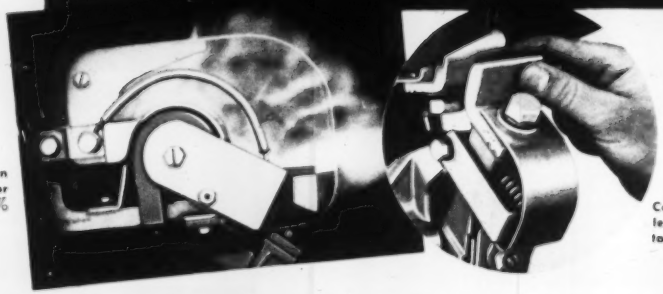
These FUNCTIONAL NAMES Speak for Themselves

WITH LINE-ARC CONTACTORS

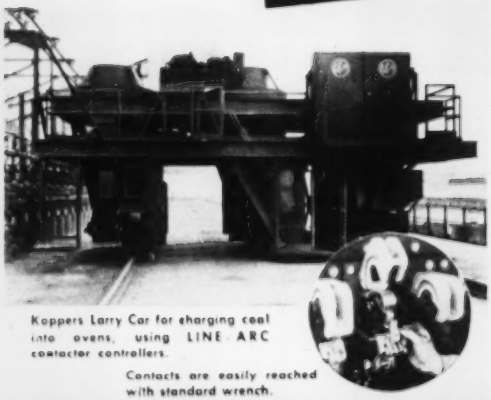
Upkeep is LOWER because

Destructive burning of arc shields is eliminated as evident in the following statement.

Glass arc shields on demonstration contactor are unharmed as 300% load is interrupted.



Cool operation lengthens contact life.



Koppers Larry Car for charging coal into ovens, using LINE-ARC contactor controllers.

Contacts are easily reached with standard wrench.

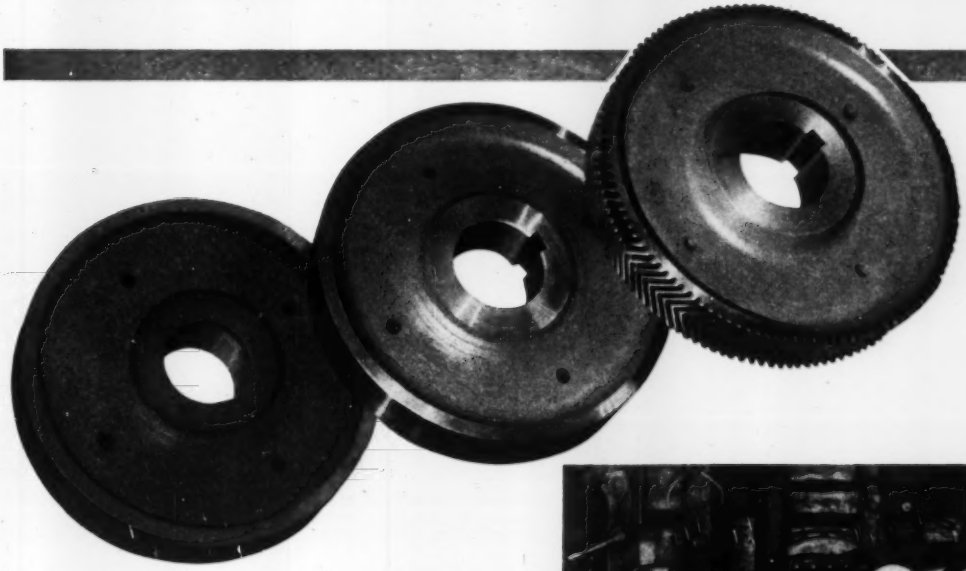
EC&M LINE-ARC Contactor Control has earned a far-reaching reputation. *Operators* like the quick response, the ease of getting motors under way, the ability to inch accurately. *Maintenance men* appreciate the fewer upkeep problems, and when attention is needed, the ease of inspection or replacement of parts. *Plant managers* value the freedom from shutdowns, welcome the low operating expense.

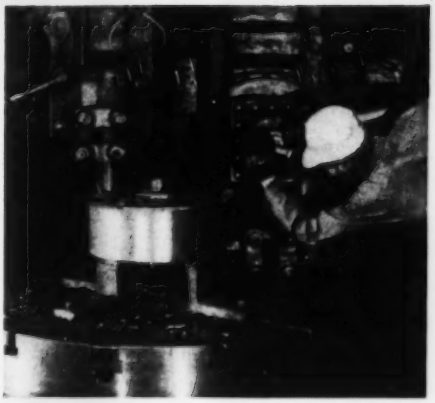
Let an EC&M engineer assist in revamping existing installations in planning control matched to new requirements.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

EC&M

A good gear is first a good blank





We're mighty careful about the gear blanks we make. As we see it, they've *got* to be good . . . for a strong, sturdy gear is first of all a strong, sturdy blank.

You'll find that Bethlehem's circular steel blanks are trustworthy products. They have uniform density, good grain structure, and homogeneity. These are qualities of high value—especially during machining operations. With Bethlehem blanks, your machinist can work swiftly and confidently, knowing that every cut, shallow or deep, will be made through clean, firm, solid metal.

Bethlehem blanks are made in a mill that first upsets the hot blocks of steel, then rolls and forges in a single operation. This sets up the most desirable grain flow and makes the products ideal for spur, bevel, miter, and herringbone gears.

In size, these strong steel blanks range from approximately 10 to 42 in. OD. They can be purchased heat-treated or untreated, as desired. Write today for Booklet 216, which contains many more details you'd like to know . . . and nearly 100 pictures showing applications and steps of manufacture.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM ROLLED-AND-FORGED CIRCULAR PRODUCTS

You'd smile, too, checking these specials

Inspectors at Barium's Erie Bolt and Nut Company have an excellent reason for smiling.

They're pleased to see how precisely Erie's special fasteners meet customer specifications.

Not only alloy steel specials like the bolts shown, but commercial bolts and studs successfully pass their rigid inspection . . . because all Erie products are made by Erie's famous-for-quality production techniques.

As an important member of the family of Barium subsidiaries supplying industry with steel in many forms, Erie must be quality-conscious. For Barium controls quality from blast furnace to finished product.

Think of Barium as a single source for steel, ready to work as a self-contained unit to speed urgently needed orders. Address your steel needs (see below for Barium's wide range of services) to Barium at 25 Broad Street, New York City.

Barium

A coordinated effort of 15 companies working in steel

MILL PRODUCTS • SHAPES TO ORDER • END PRODUCTS

BOLTS
Bayonne Bolt Corporation

STEEL PLATE
Central Iron and Steel Company

PIG IRON
Chester Blast Furnace

CRANES AND HOISTS
Clyde Iron Works, Inc.

SPRINGS
Cuyahoga Spring Company

BOLTS AND NUTS
Erie Bolt and Nut Company

METAL STAMPINGS
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DROP FORGINGS
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Wiley Manufacturing Company

For logging

For sand and gravel

For aircraft

For marine

For construction

For stone quarries

For better service and more economy . . . use

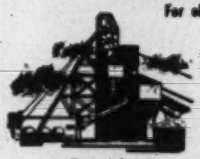
MACWHYTE WIRE ROPE

PREformed and Internally Lubricated

A THOUSAND AND ONE

to order from assures the right rope for your equipment

For elevators


For mining

For drilling

For industrial

There is a Macwhyte Wire Rope that has been specially engineered and job-proved for any particular type of equipment you operate. That's why it pays to specify Macwhyte. Over the years, ropes for all types of equipment in every field have been developed by Macwhyte. Recommendations are promptly available either from Macwhyte distributors or Macwhyte Company, 2912 Fourteenth Avenue, Kenosha, Wisconsin.

Ask for these helpful bulletins!

"Wire Rope—So What?" (No. 5134)—Illustrated exclusive interview with veteran wire rope engineer who talks straight from the shoulder about saving hundreds of wire rope dollars.

"How to Order Wire Rope" (No. 5025)—Tells exactly what to consider. Also includes convenient table of sizes, constructions, strengths and weights of Improved Plow Steel Wire Ropes.

Mill depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth • Portland • Seattle • San Francisco • Los Angeles. Distributors throughout U. S. A. and other countries carry stocks.

1010

5 Times the Service

driving air conditioning blower

CONVENTIONAL belts failed in 4 months, due to heavy overload.

G.T.M.—Goodyear Technical Man—specified Steel Cable V-Belts with load-carrying cables of airplane-type steel to handle this problem drive. Steel Cable Belts lasted 20 months 2 days—gave *five times the service.*

FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING, RUBBER-COVERED ROLLS *built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor. Look for him in the yellow pages of your telephone directory.*

GOODYEAR

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STEEL
The Weekly Magazine of Metalworking

VOL. 130 NO. 4 JANUARY 28, 1952

THIS WEEK IN METALWORKING

NEWS

Behind the Scenes	6
Letters to the Editors	12
The Metalworking Outlook	27
As the Editor Views the News	31
The Metalworking Contract Summary	40
Checklist on Controls	41
Windows of Washington	42
Mirrors of Motordom	49
The Business Trend	53
Men of Industry	57
Obituaries	60

PRODUCTION-ENGINEERING

Production and Engineering News at a Glance	63
Phosphatizing—Versatile Substitute for Metallic Coatings	64
Spot Testing Aluminum Alloys	67
How to Get More Out of Resistance Welding Control	68
More Scrap, More Tin—Detinning Produces Both	70
Progress in Steelmaking—Desulphurization	76
Calendar of Meetings	81
New Products and Equipment	83
Helpful Literature	91

MARKETS

The Market Outlook	95
Metal Prices and Composites	96
Nonferrous Metals	107
Metalworking Briefs	117

Editorial and Business Staff—Page 10. Advertising Index—Page 124. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week . . . **Felt for Finishing . . . Stampings Formed Faster . . . Tooling Can Be Cheaper . . . Blast Furnace Practice—Part IV . . . More Aluminum in Your Future**

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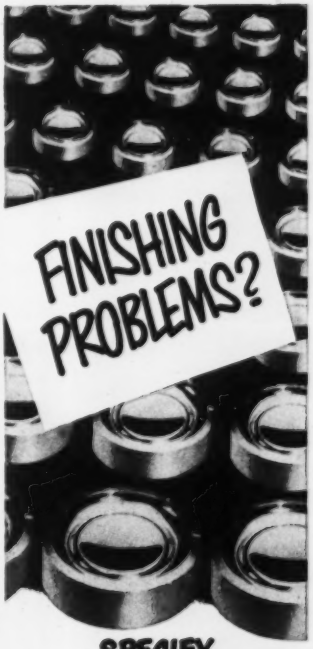

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To assure predictable finishing results in minimum time, ELGIN DIAMOND is precision graded in Elgin's own laboratories. Look for this certification . . .

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The DIAMOND POWDER in this shipment is GUARANTEED to conform to applicable standards of the U. S. BUREAU OF STANDARDS.

Finishing specialists are available to work with you in solving your specific problems . . . write today!

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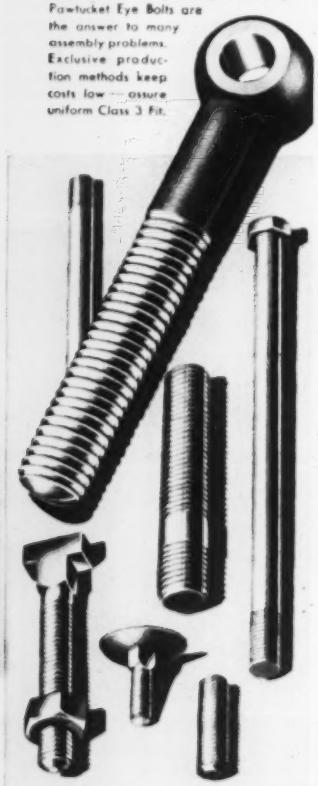
Looking for specialties?

EYE BOLTS

Accurately made in sizes $\frac{1}{4}$" and larger, or to your specifications, Pawtucket Eye Bolts are the answer to many assembly problems. Exclusive production methods keep costs low — assure uniform Class 3 Fit.



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Use Headed and Threaded Fasteners for Economy and Reliability

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THE BOLT MAN

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THE PLACE TO SOLVE YOUR BOLT PROBLEMS

T.M. REG.

Behind the Scenes...

On the Job

Geraldine, a former cleaning woman in the building and once our night editor, is back on the job. She came into a little money about six months ago and retired to less arduous duties. "But I was bored just keeping house," she reports, "so I'm back."

We've reinaugurated her title and given her the assignment of looking over the yearbook issue that came out Jan. 7 for any behind-the-scenes items of interest.

Within 24 hours we found stuck in our typewriter this note outlining her findings:

"Those editors are smart. In Facts & Figures section they estimated 1951 steel output at 105,145,000 tons. Official figures just out give 105,133,424 tons. The editors missed by only one hour's production. The 1951 auto and truck output was estimated at 7,166,000 in U. S. and Canada. Official figures now out set it at 7,160,930. The editors missed by two hours' production. That 'Who's Who in the Defense Organization' section in the issue should be helpful for anyone with Washington business. Any extra copies around?"

We checked on that last suggestion and find that copies are available, gratis. Just write Readers' Service, Penton Bldg., Cleveland 13, O.

Time and Again

Something about our pulse rate or the way we move around seems to be death on wrist watches. We've had several, but none has been satisfactory. And now that half the trousers being made these days come without watch pockets, we've never bought the pocket watch style.

So, we're probably one of the best customers in the U. S. for the telephone companies' time service. We use the Ohio Bell Telephone Co.'s number most of the time, but a while back we were up in Detroit and had frequent occasion to call up Michigan Bell Telephone Co. for the time.

We noticed something odd about Michigan's manner. Upon inquiry, we learned that the company has put into operation a new gadget which uses sound film to report the time at 10 second intervals, not at the customary 15. Over a year, Michigan will report the correct hour 3,153,600 times. Cutting the time has been accomplished by dropping a.m. or p.m. Michigan reasons that the deletion should go virtually unnoticed because if the customer doesn't know if it's day or night he probably won't care what time it is either.

Facts

That pretty snow costs the big cities $13,000 per inch to remove. More than half the automobiles now on the road have been driven 42,000 miles or more. Migration added 2,659,000 people to the population of California between 1940 and 1950. Of all the major countries of the world, Switzerland has suffered the least inflation since 1939—only 39.5 per cent.

The above information has been culled after intensive research and is listed to show that STEEL's editors aren't the only ones who can dig up interesting facts.

Shrdlu has just as broad a range as they do, too. Easter Sunday, for example, fell on Apr. 5 in 1801. Ash Wednesday came on Feb. 18. The way we figure it, Easter Sunday fell on a Saturday and Ash Wednesday came on Tuesday in that year because there was some change in the calendar setup along about that time.

Puzzle Corner

The spendthrift in the Jan. 14 problem had $17.50 at the beginning of his spree. First in with that answer were Lois Reinhart of Service Iron & Steel Co., R. W. Jernberg of Ingalls Iron Works Co., C. E. Blass of Talon Inc., Lewis D. Rice of Timken Roller Bearing Co. and some one who didn't sign his name from Ritter Co. Inc.

Thomas Camarella of Wheeling Steel Corp. submits this problem which he found in a 1903 edition of *Rogers Arithmetic*.

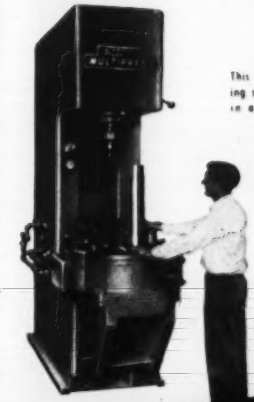
Two boys, playing snatch apple, suspended a Jonathan by a string from the ceiling of a cellar 5 feet, 7 inches high. How many feet apart must they stand that the apple in vibrating between them, may just touch their mouths 5 feet high, if the apple hung 25 inches below the ceiling before it was moved?

Shrdlu

(Metalworking Outlook—Page 27)

Cutting costs and time on

ORDNANCE OPERATIONS



This 35-ton Multipress is sizing shells to new specifications in a vital reclamation job.

MULTIPRESS

answers more needs for faster, better production at much lower cost!

A 35-ton Multipress used in impressing identification markings on shell bodies.

Quick, easy conversion is an added Multipress feature . . .

In more ways than one, Multipress is the *quick* answer to a thousand-and-one production needs — on both ordnance and civilian jobs — where better results and lower costs are in top demand.

Multipress offers *quicker* deliveries! Eight basic Multipress frame sizes are expertly designed for easy, time-saving adaptation to a remarkable range of operations. Valving, ram controls, auxiliary feeds, operating accessories, automatic inspection devices, and special tooling can readily be interlocked in a single hydraulic circuit. Time delay, for ram dwell or similar needs, is also available.

Multipress is *quick* to prove its production advantages. The speed and accurary of its smooth, oil-hydraulic ram action offers *power-control* of full, stepless adjustability. The most exacting job requirements are met with dependable uniformity and safety. There's minimum chance for error, resulting in greatly reduced scrap loss!

These and other features are *quick* to cut production delays whenever you convert from one production job to another. Multipress capacities range from *one ton* to *fifty tons*! Find out how you can boost production *now* with Multipress equipment that can pay important dividends no matter what your future production needs may be. *Write today for full details.*

The DENISON Engineering Co., 1163 Dublin Rd., Columbus 16, Ohio

DENISON HydrOILics

Link-Belt double-strand roller cham conveyor transports coils from hot mills to storage and shipping while they are weighed and cooled enroute. Safe, gentle handling eliminates scuffing of edges, telescoping of the coils.

MOVE up to 75,000 lb. COILS . . .

and get less scrap loss, greater safety

Yield goes up . . . waste goes down . . . with LINK-BELT Coil Handling Equipment

EVER-increasing rolling mill capacity and the trend toward larger coils require heavier conveyor systems capable of handling greater tonnages.

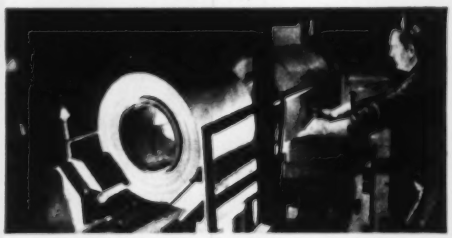
Since the inception of the continuous strip mill, Link-Belt has pioneered coil handling equipment. Now America's steel mills can choose from three basic Link-Belt conveyor types . . . designed to cover the complete range of operating needs.

Our engineers will work with your own engineers, consultants and builders of mill and process equipment. If you are contemplating expansion, it will pay you to call your nearest Link-Belt representative.

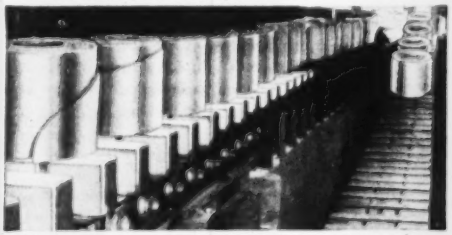
LINK-BELT

MATERIALS HANDLING, PROCESSING and POWER TRANSMISSION MACHINERY

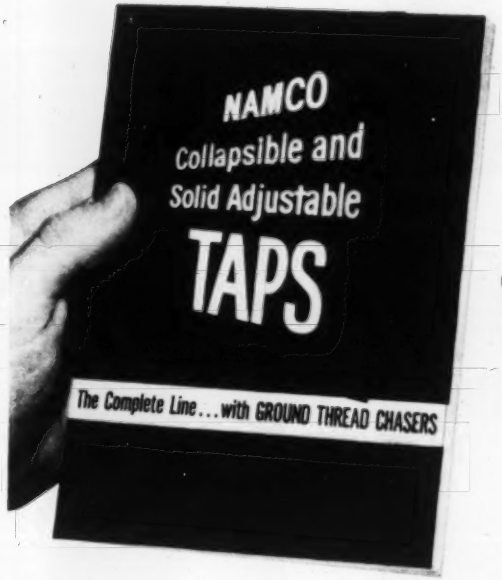
LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Cleveland 13, Pittsburgh 13, Atlanta, Dallas 1, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in principal cities. 12,453.01



Coils are lifted clear of the Link-Belt heavy-duty pallet conveyor for automatic weighing at entry end of continuous pickle line. Other Link-Belt conveyors are designed for handling coils up to 75,000 pounds each.



Where numerous turns are required or cooling space is limited, Link-Belt Cat-Type Conveyors are best. Coil never leaves its car. Without rolling or scuffing of edges, coils go around corners, up and down inclines.



Yours, for Greater Tapping Precision and Production

with **NAMCO** *ground thread precision chasers both circular* *and radial* *types*

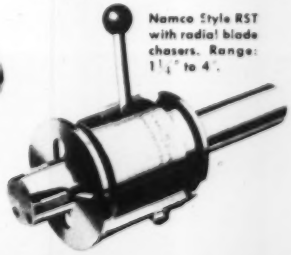
- **HARDENED** and ground precision tools, with rigid chaser support and quick, positive collapsing action.
- **QUICK** diametric adjustment — *that stays put.*
- **SMOOTHER** *precision* threads, longer chaser life and continuous trouble-free operation.

THESE advantages are yours in every Namco tap—whether for straight threads or tapered—American National Pipe, Dry Seal or API. (Taper pipe chasers usually shipped from stock.)

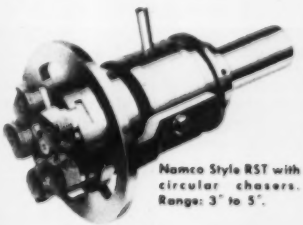
Namco collapsible taps are the companion tools to the famous Vers-O-Tools, using ground-thread circular and adjustable blade chasers—standard in hundreds of shops.

For fast, economical threading investigate Namco *first.* Send drawings, specs or samples. And ask for new catalog T-51. *Keep it handy.* Better still, ask for one of our threading specialists to call and make recommendations.

Namco Style RSA solid adjustable. Range: $1\frac{1}{4}$" to 4".



Namco Style RST with radial blade chasers. Range: $1\frac{1}{4}$" to 4".



Namco Style RST with circular chasers. Range: 3" to 5".

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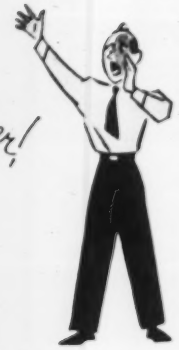

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With a Kidde System, there is no water damage, no messy residue to ruin costly machinery, electrical equipment or documents. And that means no interruption in production. Find out more about Kidde Fire Protection today. Write to:

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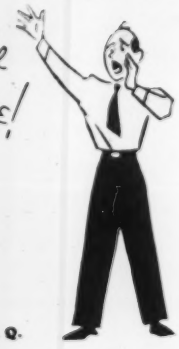
160 Main Street, Belleville 9, N. J.



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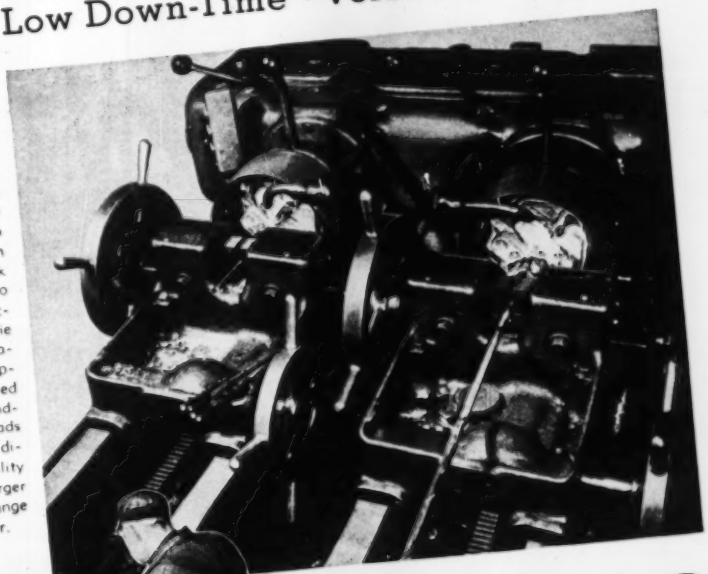
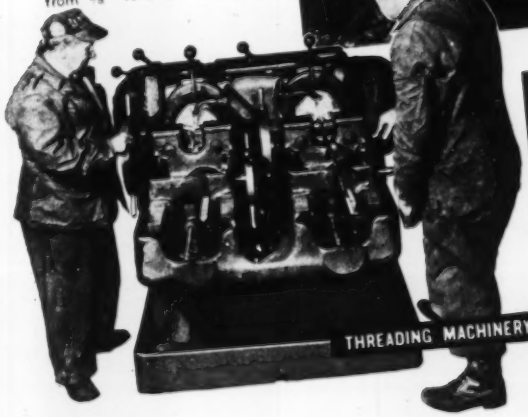
"ideal"

FOR SMALL SHOP THREADING JOBS

Accurate Threads · Easy Operation
Low Down-Time · Versatile Capacity

This 1" Landmaco Double Machine is threading 3/8" and 1/2" cold drawn steel rods for structural and ornamental steel. The 13 and 16 pitch USS threads are cut 6" long, but on similar jobs threads are cut up to 20-foot lengths. Production costs are lower than with previous methods. This installation is an example of the value of Landmaco Double Machines in job threading work. Threads can be cut to Class 4 fit, yet work completed at the rate of 40 to 45 surface feet per minute, according to diameter. Two die heads can be operated on separate jobs, with separate operators, or both heads can be fed by a single operator. This Landmaco Double will cut threads ranging from 1/4" to 1" in diameter, providing the versatility essential in any job shop. Larger Landmacos will handle a range from 3/8" to 2 1/2" diameter.





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THREADING MACHINERY · THREAD CUTTING DIE HEADS · COLLAPSIBLE TAPS

If you buy Cutting Tools

Are you responsible for purchase or specification of cutting tools —or wear and abrasion-resistant parts? You'll find the *Gorham* Tool Catalog a *helpful time saver!* 120 pages, packed with useful information, describe and illustrate the complete *Gorham* line—*PLUS* an informative section of Engineering Data. Request your free copy on company letterhead.

We also offer the service of *Gorham* field engineers, whose counsel in specification and design for special tooling problems is yours for the asking. Their recommendations are backed by *Gorham's* 25-year background in tool design, manufacture and heat treatment. Write for the name of your nearby *Gorham* representative.

Gorham TOOL COMPANY

14401 WOODROW WILSON
DETROIT 3, MICHIGAN

LETTERS
TO THE EDITORS

Slick Spray Gun Sought

Please advise the name of the company who developed the "Egaspray" gun as mentioned in your Oct. 29 (p. 63) issue.

G. P. Hungerford
senior chemical engineer
American Machine & Foundry Co.
Brooklyn, N. Y.

Will you be good enough to send us the name of the manufacturer . . .

A. M. Bush
Bush Industries Inc.
New York

. . . are interested in obtaining further details of this process.

Morton S. Titleman
industrial engineering dept.
Dominion Bridge Co. Ltd.
Montreal, Que.

. . . intrigued by the item . . . have been trying to track down more information.

John W. Reinhardt
advertising manager
Proctor & Schwartz Inc.
Philadelphia

. . . . appreciate further information . . . so that we could look into its possibilities for spraying lacquers.

R. S. Voris, supervisor
cellulose products research div.
Hercules Powder Co.
Wilmington, Del.

. . . our interest is that we are in an exceptionally strong position to sell and distribute just such an item.

Lee Turner
Cincinnati

As a constant reader of your fine magazine I should be very glad if you could give me some details . . .

A. L. Phillips
Metal Finishing Inc.
New York

• *The spray gun is a product of Ega Developments Ltd., Holyhead Rd., Wednesbury, Staffordshire, England.*

Quick Reply

RE HOW TO DO BUSINESS UNDER GOVERNMENT CONTROLS (JAN. 7 P. 127). SHOULD CMP REGULATION 6 BE CMP REGULATION 5 AND VICE VERSA?

RODNEY R. ANDERSON
HOUSTON

• *You're right.*

Who and Where Department

May we have further information about the process for printing on sensitized thin-gage aluminum sheet from ordinary photographic negatives (Sept. 24, 1951, p. 93).

L. H. Ritzma, advertising manager
Ohmite Mfg. Co.
Chicago

• *Write Edwin T. Goodridge, president, Horizons Inc., Princeton, N. J.*

FLAT SPRING STEEL

No more waiting! Roebling's expanded facilities can meet your needs right now!

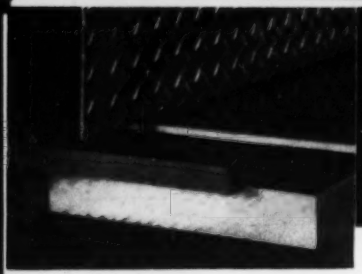
PROMPT! FAST! . . . that's the sort of deliveries you can count on now for Roebling high carbon flat mechanical spring steel. For many years Roebling has had one of the largest specialty mills in the country and today's expanded facilities have boosted production to new highs.

Roebling flat spring steel is made as you want it . . . annealed, hard rolled untempered; scaleless tempered; tempered and polished, blue or strawed. And from open hearth to finished product, Roebling positive control assures uniform quality . . . saves preparation time for users . . . brings faster, smoother production.

Roebling is ready to furnish flat spring steel with the exact mechanical properties required for any special type of application. Write or wire now for full information. John A. Roebling's Sons Company, Trenton 2, New Jersey.

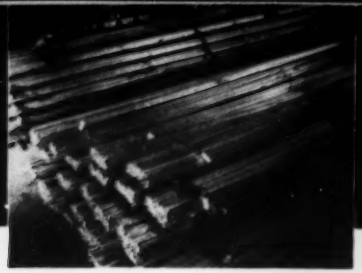
ROEBLING

Atlanta, 934 Avon Ave ★ *Boston*, 51 Sleeper St ★ *Chicago*, 5525 W. Roosevelt Rd ★ *Cincinnati*, 3253 Fredonia Ave ★ *Cleveland*, 701 St. Clair Ave, N.E. ★ *Denver*, 4801 Jackson St ★ *Detroit*, 915 Fisher Building ★ *Houston*, 6216 Navigation Blvd ★ *Los Angeles*, 216 S. Alameda St ★ *New York*, 19 Rector St ★ *Odessa, Texas*, 1920 E. 2nd St ★ *Philadelphia*, 230 Vine St ★ *San Francisco*, 1740 17th St ★ *Seattle*, 900 1st Ave, S. ★ *Tulsa*, 321 N. Cheyenne St ★ Export Sales Office, *Trenton, N. J.*



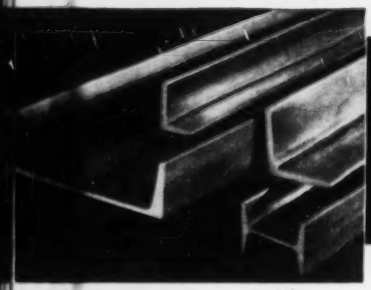
SHEET AND PLATE: Flat and coiled sheet; circles; patterned sheet; plate; tread plate; roofing and siding sheet; roofing accessories and fasteners; specialty sheet.

WIRE: Coiled and straight lengths; rivet wire; flattened and slit wire.

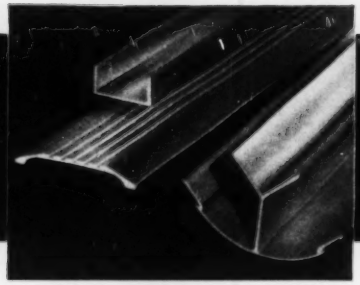


SCREW MACHINE STOCK: All free-cutting alloys plus the higher strength alloys—24S, 61S and 75S.

These are the MILL PRODUCTS of ALCOA

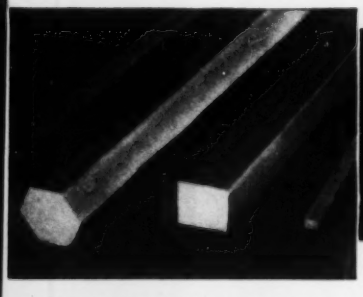


ROLLED SHAPES: Equal angles; unequal angles; channels; I-beams; H-beams; Tees; Zees.

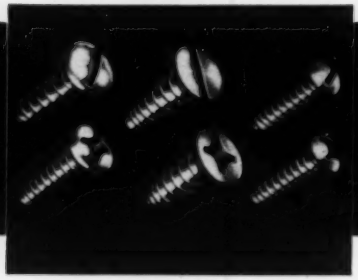


EXTRUDED SHAPES: Miscellaneous extruded shapes such as angles, channels, half rounds, quarter rounds, thresholds, truck corners and structural members, etc. Round, square, and rectangular bars.

TUBE AND PIPE: Coiled tube; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; irrigation pipe; rigid conduit.



BAR STOCK: Square, hexagonal and rectangular bar stock in free-cutting and higher strength alloys.



FASTENERS: Machine screws; wood screws, washers, nuts, bolts, rivets.

WELDING AND SOLDERING SUPPLIES: Welding and brazing wire; welding and brazing flux; solder flux; solder.

ALUMINUM COMPANY OF AMERICA

They have

these twelve basic advantages and scores of others

- Light Weight
- High Resistance to Corrosion
- High Electrical Conductivity
- High Conductivity for Heat
- High Reflectivity for Light and Radiant Heat
- Workability
- Non-Toxic
- Strength in Alloys
- Non-Sparking
- Non-Magnetic
- Appearance
- High Scrap and Re-Use Value

They are

available from your local ALCOA sales office, distributor or jobber subject to Government Regulations

For help in interpreting government regulations and all possible cooperation in filling your rated orders call on your local Alcoa sales office, distributor or jobber. You'll find them listed under "aluminum" in your classified phone book.

With them

goes the skill in fabricating, assembly and finishing of 64 years of Aluminum knowledge

This know-how plus the help of the world's greatest aluminum research and testing facilities is available to you through your local Alcoa sales office.

There are

no restrictions on the aid and know-how that go with them

For technical literature and movies to train your personnel, for the personal help of Alcoa sales engineers, for the long-range research and testing of aluminum for your products, call your local Alcoa sales office.

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ALCOA ALSO MAKES PRODUCTS TO CUSTOMER SPECIFICATION

CASTINGS . . .
sand, plaster, permanent mold and die.

FORGINGS . . .
drop, hammer and press forgings.

SCREW MACHINE SPECIALTIES . . .
special fasteners and screw machine parts.

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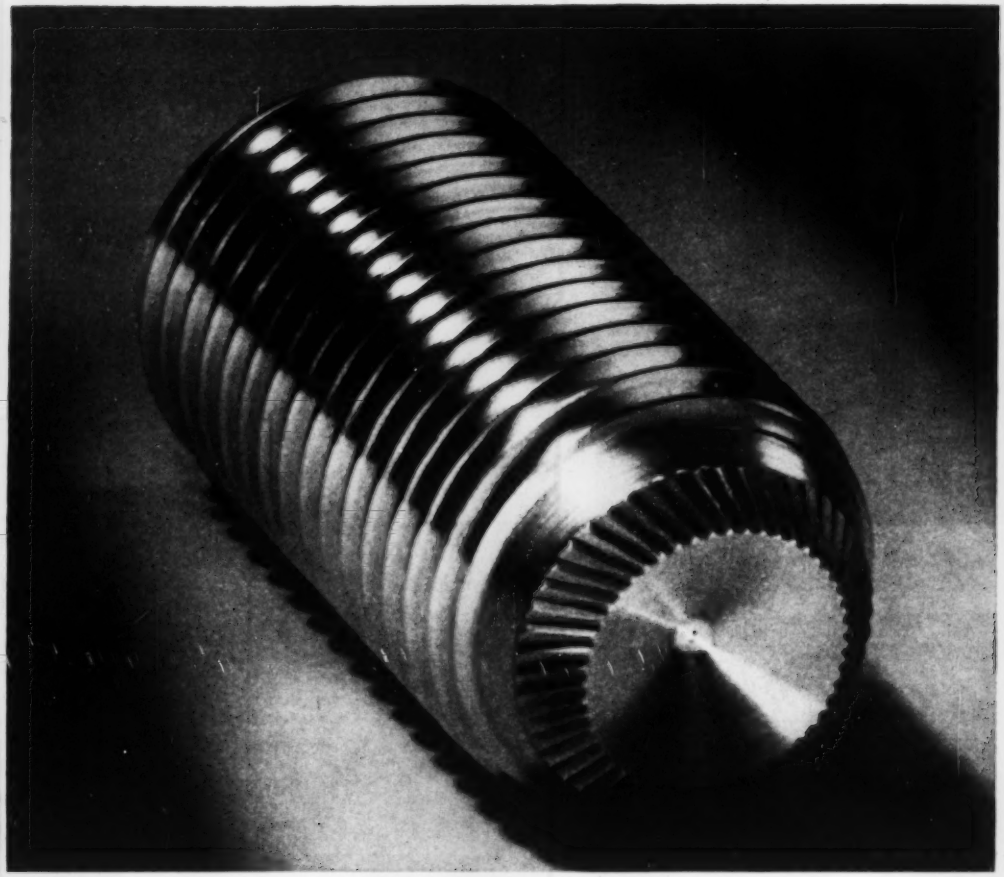
EXTRUDED SHAPES

"SEE IT NOW," with Edward R. Murrow, brings the world to your armchair...CBS-TV every Sunday--3:30 P.M. EST

ALCOA *first in* ALUMINUM



SELF-LOCKING SOCKET SET SCREWS

ORIGINATED BY UNBRAKO®

. . . the screws that won't work loose

Unique counterclockwise knurls make these UNBRAKO Set Screws self lockers, prevent creep and subsequent loosening. Because UNBRAKO Self-Locking Set Screws stay tight, even in poorly tapped holes, they reduce maintenance costs and production losses. Write for descriptive literature. STANDARD PRESSED STEEL CO., Jenkintown 33, Pennsylvania.

SPS recommends STANDARDS — #4 to 1" available in UNBRAKO distributors' stocks.

Ask your UNBRAKO distributor about deliveries. You'll be pleasantly surprised. Even in the larger sizes, you'll find deliveries of UNBRAKO Screws are good.

SPS

UNBRAKO SOCKET SCREW DIVISION

JENKINTOWN PENNSYLVANIA

UNITED

14,000 TON FORGING PRESS

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ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at { Pittsburgh • Vandergrift • New Castle
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Labdell United Company, Wilmington, Delaware
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

GET IN THAT IRON AND STEEL SCRAP!

An Emergency

FACES AMERICA'S STEEL INDUSTRY!

America's steel industry must have more scrap *immediately* if it is to meet defense production needs. The shortage of scrap is now the worst it has been since the days of Pearl Harbor. Steel production is bound to slow up unless scrap supply improves!

The odds and ends of scrap in your plant may not seem to amount to much. But it may be more than you think, and even small amounts are important. Added together, the scrap from industrial plants throughout the country will make hundreds of thousands of tons of vital steel.

Look around your plant, warehouses and yards for all the scrap you can find. Worn out machines, tools, pipe, boilers, structural parts—anything of iron or steel that can be spared. Sell them to your scrap dealer *now*. Every bit will help to meet this emergency.

Scrap Metal Market Conditions Described As Wholly Unsatisfactory

Mill Stocks Of Scrap Generally At Critical Low

Steel Warehouse Trade Participating In Collection Drive

Steel Scrap Supply Continues Tight On The Pacific Coast

SCRAP DRIVE HERE TO BE STEPPED UP

Commerce Department Office to Scout Auto Graveyards to Supply Steel Mills

Scrap Supply Seen As Most Critical Problem

Industry Men Meeting

Steel Producers Seek More Scrap From Industrial Consumers

Demand on Steel Continues Stron

STEEL INVENTORIES REACH A MINIMUM

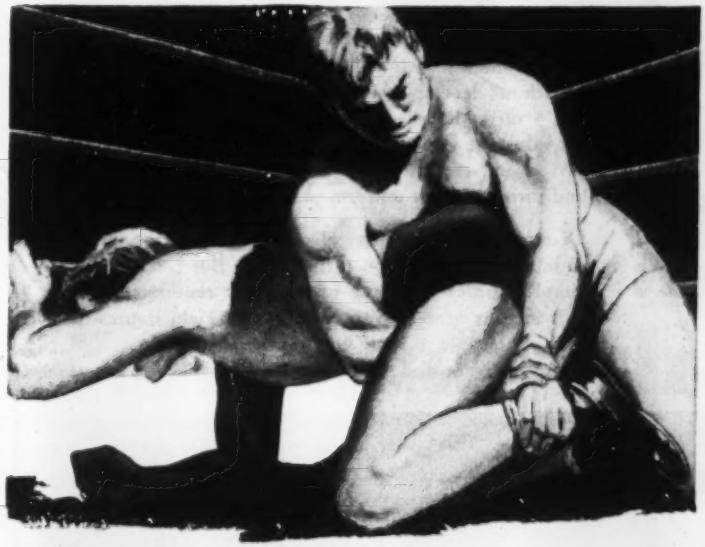
Deliveries to Warehouses Are Expected to Drop by 23% During Fourth Qu

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

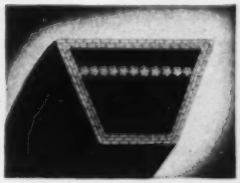
Dayton Cog-Belts* *bend* better...*are* better!



Dayton raw-edge Cog-Belts are the *only* V-Belts scientifically designed to bend as easily as your finger. The cogs "close up"—take up the compression as the belt goes around the pulley. Result: Less strain . . . cooler running . . . smaller pulleys . . . 40% more horsepower . . . much longer belt life.

See HOW MUCH better Cog Belts are!

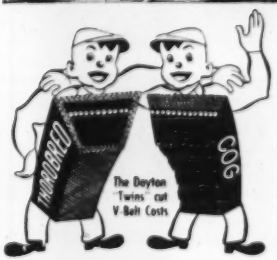
This V-Belt drive transmits the power from two diesel engines to a dredge pump, which delivers 100 cubic yards of sand and gravel per hour. The former drive used 16 ordinary V-Belts which were capable of handling 140 constant horsepower. But the dredging company wanted to step this up to 188 horsepower, to meet new production requirements. Trouble was, the increased load meant adding more belts—*and there was no room for pulleys with more grooves!* The Dayton Distributor simply put Cog-Belts on the drive. Now the same number of belts carry the increased load—and the dredge's space problem is solved. Whether *your* drive problem is *space*, *cost*, or *longer life*, it will pay you to look into the advantages of the Dayton Cog-Belt.



FOR REGULAR DRIVES . . . THE DAYTON THOROBRED V-BELT IS TOPS!

The Dayton Thorobred V-Belt is the V-Belt for standard drives. Its patented, three-prime-section design, containing high-tenacity rayon cords, and its durable double wrap, result in exceptionally long life. The Dayton Thorobred V-Belt has set completely new standards for long life and trouble-free service at minimum cost!

*T.M



See "Belting" in the yellow pages of your local telephone directory for the Dayton V-Belt Distributor. Let him solve your drive problems!

Dayton Rubber

Since 1905

World's Largest Manufacturer of V-Belts

DAYTON RUBBER COMPANY • DAYTON 1, OHIO

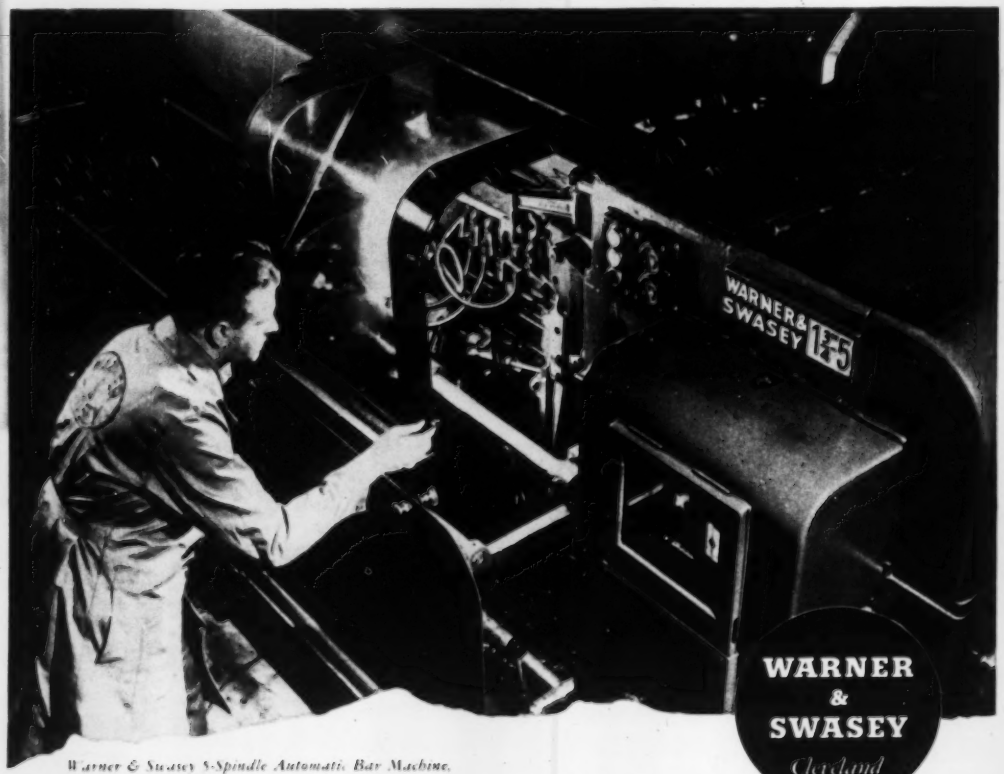
Don't buy five machines when two will do the job—BETTER!

● Let's say you received a defense order in 1941 that required purchasing 5 turret lathes.

Today, when you receive a similar order, it might be quite natural for you to assume you'd again need 5 machines. But just as weapons or products have developed, so have the tools with which they're made.

In many cases these products can be made faster and more profitably with Warner & Swasey automatics —machines developed since the last war. Instead of reordering, say, 5 turret lathes, you may need only 2 of these automatics. They'll cost you less in total investment, require less floor space and fewer operators, and turn out more uniform parts at a higher rate.

Of course, there are—and always will be—many jobs that should be done *only* on turret lathes. But before you simply reorder according to your past requirements, first call in your nearest Warner & Swasey Field Representative. He may be able to show you how you can boost your production and profits with Warner & Swasey automatics.



Warner & Swasey 5-Spindle Automatic Bar Machine, one of Warner & Swasey's line of automatic machines.

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS AND TAPPING MACHINES

THIS IS **URGENT**

Production Scrap *alone* won't make the steel you need!

Read what Defense Mobilizer Charles E. Wilson says:*

"In order to achieve the tremendous goal of 110,000,000 tons of steel this year, 36,000,000 gross tons of iron and steel scrap must be channeled back to the steel mills and foundries. That is 6,500,000 tons above what was needed in 1950. *Normal scrap recovery sources cannot produce such amounts. Emergency sources must be discovered and activated.*"

**In a letter to the editor of* PLANT ENGINEERING, *Aug. 10, 1951.*

ALL OF US MUST DIG DEEPER—*GET OUT THE HIDDEN SCRAP!*

Your plant could be one of the emergency sources Mr. Wilson is talking about. Appoint a scrap and salvage team. Study plant layout to determine what can be scrapped. Then turn it up and turn it over . . . to your scrap dealer for cash.

Check your plant for obsolete, broken, worn-out and irreparable:

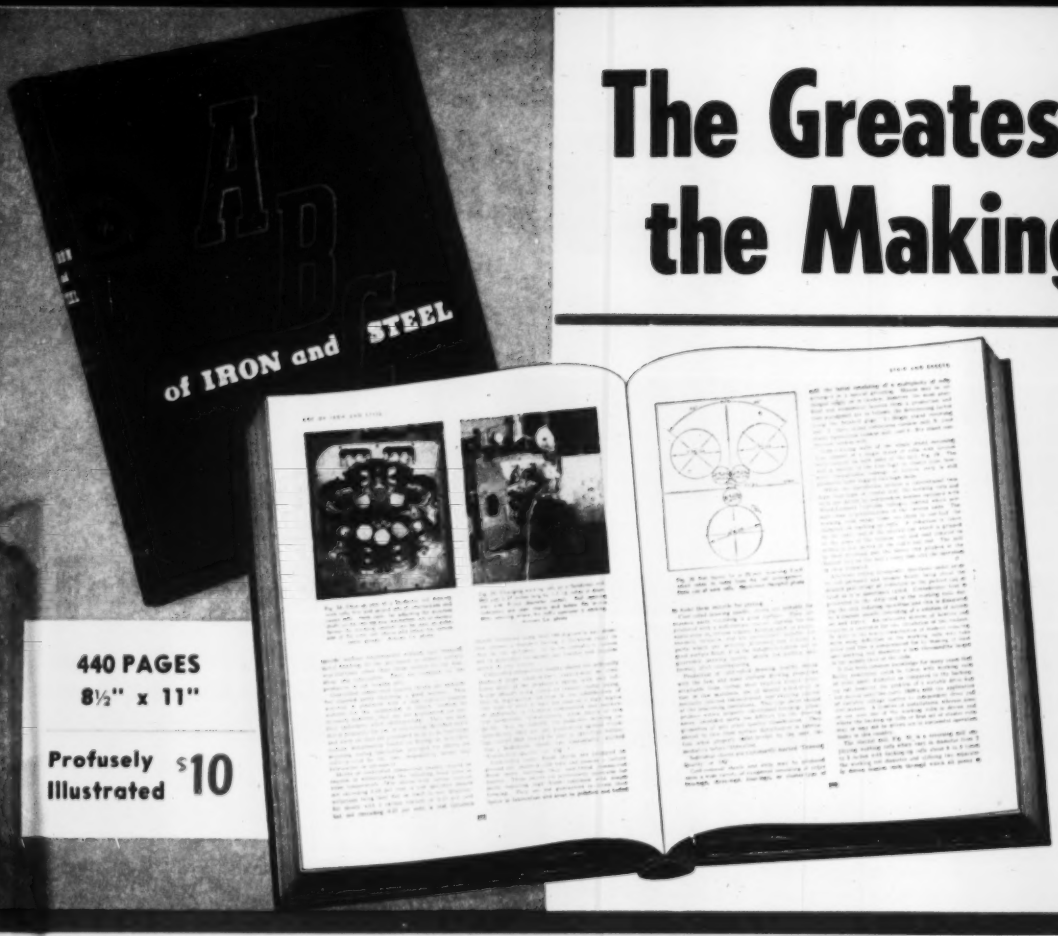
☐ machinery ☐ dies ☐ jigs ☐ fixtures ☐ tanks ☐ boilers ☐ rails ☐ pipe and fittings
☐ motors ☐ machine bases ☐ tools ☐ chain ☐ structural steel ☐ valves ☐ starters
☐ transformers ☐ castings ☐ steel barrels ☐ nuts and bolts

Sell them to your scrap dealer NOW!

REPUBLIC STEEL CORPORATION

General Offices • Cleveland 1, Ohio

The Greatest ... the Making



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Published by The Penton Publishing Co., Penton Building, Cleveland 13, Ohio

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By 31 Experts

The ABC brings you the combined knowledge and experience of 31 outstanding authorities on steelmaking! It's the only book of its kind available today.

THAT BOOK YOU SEE PICTURED at the left, "The ABC of Iron and Steel," represents years and years of constant work and study in every branch of iron and steel practice—every statement in it is the result of actual, first-hand experience. The ABC was conceived and published in answer to the demand for a book that should cover the entire iron and steel industry.

It was obvious from the start that no *one* man *could* write such a book. The thorough and comprehensive knowledge necessary for such an undertaking could be acquired only by long and careful study, and years of practical experience in each one of the branches of iron and steelmaking. A lifetime would be too short.

But the problem was solved. For each chapter we searched the iron and steel industry to recruit some of the authorities best qualified to tell you about modern iron and steel practice. The chapter on Hot and Cold-Rolled Strip and Sheets was written by Charles L. McGranahan; the production of Forgings by Waldemar Naujoks; the making of Tin Plate by Alfred E. Kadell—and so on right down the list. The ABC has *thirty-one* different authors, each a recognized authority on some one branch of the iron and steel industry, and each writing about just his own particular specialty.

The result is that every statement in "The ABC of Iron and Steel" bears the stamp of authority. It is the last word on every question of iron and steel practice.

Although this book is the work of skilful, highly trained specialists, every bit of it is written in simple, non-technical language, and to make things doubly clear, hundreds of photographs of the various operations and equipment are included in the book.

Reading "The ABC of Iron and Steel" is just like watching a ton of iron ore in its progress down from the mines, through the blast furnace, steel works, and rolling mills with an expert always at your elbow to explain every process and answer all your questions.

the Experts

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Serves the Electric Motor User in Two Important Ways:

1. Century motors are designed and constructed for a long, dependable operating life.

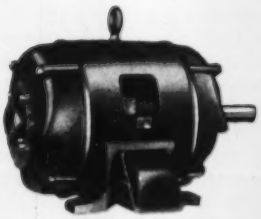
2. Just as important—they are skillfully selected to match the operating characteristics of the many kinds of equipment they drive.

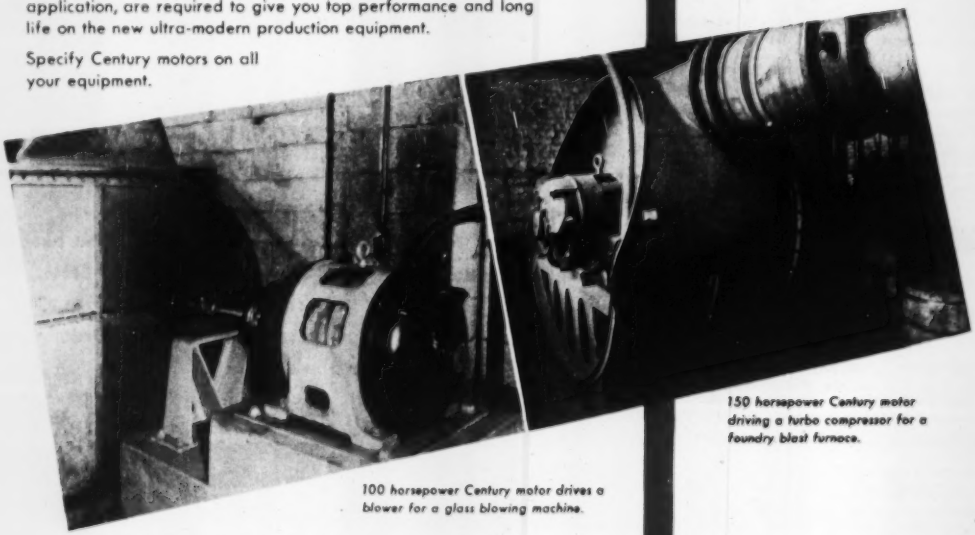
IN CENTURY'S wide range of types and sizes (up to 400 H.P.) there are available: 4 standard classes of starting torque characteristics—6 methods of speed control—constant and short time ratings—4 basic classes of frame protection against atmospheric hazards—a dozen methods of mounting the motor to the equipment—plus many special specifications to meet the requirements of the BIG NAME equipment manufacturers who use Century motors as a component part of their equipment.

Teamwork with equipment producers gives you skillfully selected motors from Century's wide range of types and sizes . . . properly applied to match the performance characteristics of the machines they drive.

Both a properly designed and constructed motor, plus skillful application, are required to give you top performance and long life on the new ultra-modern production equipment.

Specify Century motors on all your equipment.





100 horsepower Century motor drives a blower for a glass blowing machine.

150 horsepower Century motor driving a turbo compressor for a foundry blast furnace.

Century SERVICE Is Near Any CENTURY Motor Driven Equipment

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1. Facilities for immediate exchange of most CENTURY standard ratings of standard construction are available at CENTURY Authorized Service Stations.
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3. Genuine CENTURY renewal parts are available at CENTURY Service Stations, CENTURY Parts Distributors and at the factory in St. Louis.

704

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CENTURY ELECTRIC CO.

1806 Pine St. • St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

America needs your daily pound of scrap

IF every man, woman and child in America provided one pound of scrap each day, they would supply just about enough to produce the 105 million tons or more of new steel that the industry hopes to make in 1952.

Like yeast in breadmaking, scrap is essential to steelmaking. Scrap speeds up the process because scrap is already-refined steel. Every ton of scrap used replaces one ton of pig iron. Thus scrap also saves raw materials, because each ton of pig iron represents two tons of iron ore, one ton of coal and half a ton of limestone.

The continuing co-operation of every reader of this page is urgently requested to overcome a scrap shortage daily growing more critical. Turn in--by selling your scrap to regular scrap-gathering channels--any and all broken, worn-out or obsolete things made of iron and steel--machines, tools, pipe, boilers, structural parts and other "junk" you'll probably never use again.

Do your part in the campaign to help meet America's need for more steel. Enlist now for the duration. Remember that the scrap you furnish may help you get more steel.

YOUR SCRAP IS NEEDED — YOUNGSTOWN

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment

3 Typical Examples of GREATER OUTPUT ...REDUCED COSTS

. . . with Texaco Cutting Fluids and Lubrication Engineering Service

*EXAMPLE No. 1: *130% Greater Production between tool grinds.* Steel pump parts were being machined on automatics. When *Texaco Cleartex Cutting Oil* replaced a competitive fluid, production between tool grinds more than doubled. Moreover, *Texaco Cleartex Cutting Oil* could be used as both coolant and machine lubricant, eliminating contamination and oil wastage.

*EXAMPLE No. 2: *75% Longer Drill Life.* The job was drilling shotgun barrels. Short tool life was overcome by the Texaco Lubrication Engineer's knowledge of the right *type* of cutting fluid to use. When *Texaco Sultex Cutting Oil* went on the job, tool life nearly doubled and downtime for tool changes was greatly reduced.

*EXAMPLE No. 3: *Chaser Life Doubled.* In threading stainless steel packing nuts the greatest difficulty was frequent chaser breakage. Change to *Texaco Cleartex Cutting Oil* increased chaser life from three to six shifts. In addition, both steel and brass can now be worked without changing oil. *Texaco Cleartex Cutting Oil* does not stain.

Whatever the metal being worked or your method of machining it, there is a *Texaco Cutting, Grinding or Soluble Oil* to enable you to do the job better, faster, at lower cost. A Texaco Lubricating Engineer will gladly work with you.

To protect oil film roll necks, use *Texaco Regal Oil* — turbine-quality, for bearings in heavy-duty service. Resists oxidation, emulsification, sludging. To prolong life of heavy-duty enclosed gears and bearings, use *Texaco Meropa Lubricant*. Stands up under heavy loads, does not foam.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

*Name on request

TEXACO CUTTING, GRINDING AND SOLUBLE OILS FOR FASTER MACHINING

Faithfully yours 50 *for Fifty Years*

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA broadcasts every Saturday afternoon.

January 28, 1952

More Steel: New CMP Problem

The easing in steel supplies (p. 35) poses a new problem for CMP officials: How to change allocations fast enough to keep pace with new conditions. Some fabricators of CMP products, such as steel tubing, find that part of their production goes begging because customers don't have enough tickets—issued when supplies were tighter—to take the material legally even though they could use it. Although they have that problem to solve, the planners believe another difficulty is licked, that of finding homes for all aluminum allocations. NPA says: "All holders of aluminum allotments will, upon application to the Aluminum & Magnesium Division, be guaranteed positions on a mill schedule."

Gain in Electronics

Literally speaking, electronics production for defense is 30 per cent behind schedule, but the situation isn't serious. Much of the money dispersed by the government thus far has gone into behind-the-scenes tooling and research and development. The fruits of that non-productive spending will mature into actual production soon. Expect sharp gains in electronics output this year that will level off on a high plateau of production that will continue for 12 to 18 months.

To Take Up the Slack

The atom expansion program will come at just the time when construction and expansion in many other fields will be dropping. Result: An important bulwark to the economy will be provided by the atom program which will cost at least $5 billion over the next five years. Additional billions will be needed to operate new atom plants—when they're built—and to turn fissionable materials into weapons.

Matter of Imports

If you don't believe we're becoming a have-less nation in regard to materials, take a look at these figures. Each M47 tank requires: 1915 pounds of chromium of which 99 per cent of the ore is imported; 950 pounds of manganese of which 92 per cent is imported; 520 pounds of nickel of which 92 per cent is imported; 100 pounds of tin of which 78 per cent is imported; 6512 pounds of bauxite (the ore of aluminum) of which 65 per cent is imported; 1484 pounds of copper of which 29 per cent is imported.

In Business—Renegotiation Board

The Renegotiation Board is at last functioning. Regional offices have been established in Washington, New York, Chicago and Los Angeles. The board has also won agreement that renegotiation of defense contracts subject to the 1948 law will be handled by it. In getting set up, the board has organized itself just in time, for renegotiation cases are piling up now that defense production is gaining. About $2 bil-

Production-Engineering News—p. 63 *The Market Outlook—p. 95*

lion a month in military goods is currently being delivered. Some $20 billion worth has been shipped since mid-1950 and $40 billion worth more is still on order.

Independent Thought

Secretary of Commerce Charles Sawyer is again risking Administration charges of insubordination. Three months ago he remained in the cabinet even though he blasted budgetary policies of the Administration. Now he is criticizing the formation of Small Defense Plants Administration because it duplicates activities carried on in his own department.

More Government Resignations

Politics and growing dissatisfaction with Mr. Truman's policies are causing restiveness among many Administration officials. Eric Johnston is gone from ESA; Stuart Symington has left RFC; even Michael DiSalle is quitting OPS. In coming months more men will be resigning.

Step Up in Antitrust Suits?

Watch for more government activity in antitrust suits. Congress, especially the House Small Business Committee, is needling the Justice Department. Assistant Attorney General H. Graham Morison, head of the Antitrust Division, has given U.S. district attorneys instructions to give "special attention" to complaints of violation of the Robinson-Patman Act and other antitrust laws. One civil suit has already been filed against International Business Machines Corp. for alleged restraint and monopoly in the tabulating industry.

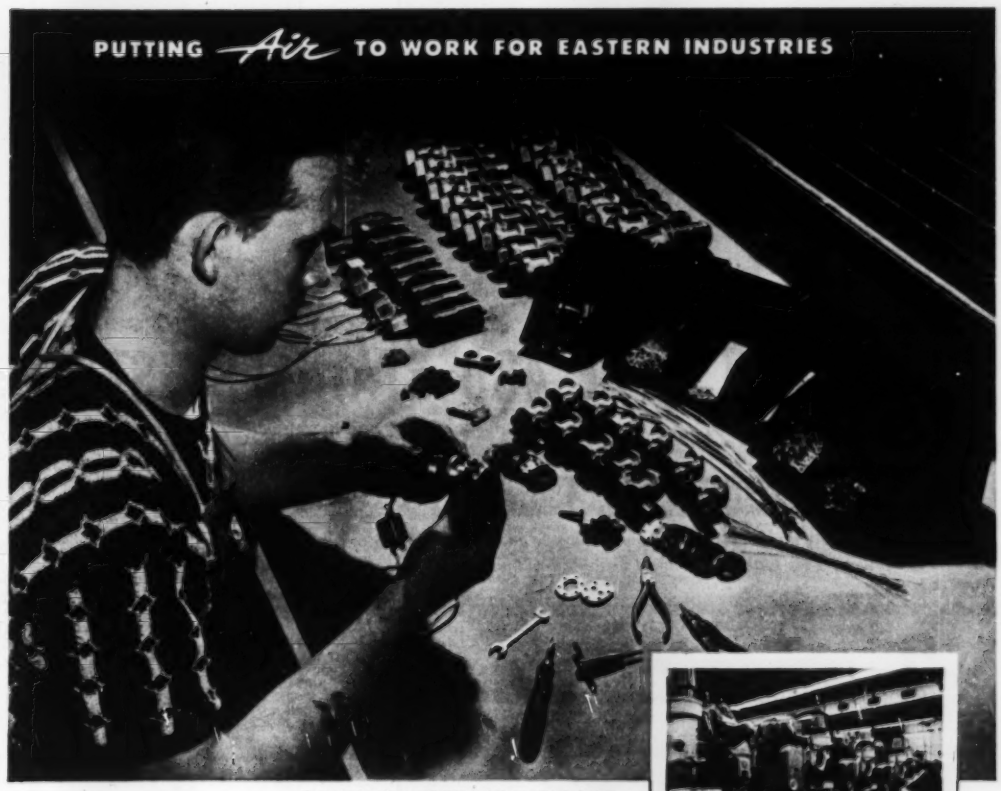
Straws in the Wind

Westinghouse Electric Corp. has won a $2 million contract for the main roll and auxiliary drive electrical equipment for Pittsburgh Steel Co.'s new 66-inch cold strip mill at Allenport, Pa. . . . Plant expansion this quarter will run at an annual rate of more than $26 billion, compared with slightly under $25 billion in the last three months . . . Heppenstall Co. is reopening an Eddystone, Pa. plant which it operated during World War II; it will produce alloy steel die blocks to feed forging and extrusion presses of the drop forging industry.

Here and There in Industry

More finished steel—72.5 million tons—was shipped in the first 11 months of 1951 than in all of 1950 or any other year (p. 36) . . . Count on peak defense output for the next two years; the Truman budget cuts won't show up until late 1954 (p. 37) . . . Industrial use is gaining for electric air cleaners (p. 38) . . . Fewer new companies are being formed because the going is rough these days (p. 39) . . . Two-thirds of the nation's scientists and engineers are engaged in military research and development costing $1.5 billion (p. 41) . . . Today's production worker has nearly twice as much electricity at his command as in 1939 (p. 46) . . . The defense expansion program is about half finished (p. 47).

PUTTING *Air* TO WORK FOR EASTERN INDUSTRIES



Machined surfaces flat to one light band—that's one-millionth of an inch—are made possible the year 'round by Westinghouse air conditioning.

CONDITIONED AIR

HELPS WIPE A WINDSHIELD AT 30,000 FEET

This midget motor-pump sprays a grease-removing solvent onto aircraft windshields. Another provides ground-level conditions for air-borne radar in the stratosphere. Eastern Industries *mass produces* both, but with *tool-room precision.* Critical dimensions are held to plus or minus 25 millionths of an inch! That just isn't possible in hot, humid air.

The answer? Westinghouse-conditioned air maintains plant-wide, controlled atmosphere for such exacting machining, assembling, testing and inspecting. Air conditioning and air cleaning assure a constant temperature and humidity the year 'round, help guard against the dirt, rust and corrosion that will upset delicate gauges or mar super-finished surfaces.

Your product, processes and employees will do better in Westinghouse engineered air. Let us help you *put air to work* for more production, higher quality or improved methods. Check the Yellow Pages for your local Westinghouse Air Conditioning Distributor, or write Westinghouse Electric Corp., Air Conditioning Division, Hyde Park, Boston 36, Massachusetts.

Ducts supply entire building with conditioned air for precision work like this gear cutting operation.

This electronic gauge is so sensitive that even your body heat can cause deflections in its readings.

Their 100 hp Westinghouse compressor is as foolproof as your refrigerator, will give years of service.

YOU CAN BE SURE... IF IT'S

Westinghouse

J-80248

4 facts*

ABOUT TYPE 430 STAINLESS STEEL

1 Type 430 is available NOW

There are no government restrictions on end uses for Type 430 stainless steel—one of the oldest standard stainless types. Other chromium types are also available. Only nickel-bearing stainless steels, such as well-known 18-8, are restricted under NPA Order M-80.

2 Supplied in ALL FINISHES

Armco 17 Stainless Steel sheets, strip and plates are supplied in the same gages, sizes and finishes as 18-8.

3 Has many uses

Type 430 is normally specified in many applications, and its use has been growing in recent years. Under present conditions it will also serve as a satisfactory alternate for Type 302 in a wide range of products.

However, Type 430 should not be considered a "cure-all." In many applications it may not be entirely satisfactory—but still the best metal available today.

4 Readily fabricated

Almost any product now made of stainless steel can be fabricated of Type 430. It may require greater care and more operations at higher cost—one big reason why Type 302 is always preferred for many products.

Forming characteristics are about the same as hot-rolled steel, but welds are less ductile and less resistant to shock loading. With modifications in drawing practice, Armco 17 will take difficult draws.

To help you determine whether or not Type 430 is suitable for your products, we have just published a new folder listing satisfactory and unsatisfactory uses. A bulletin on "How to Fabricate Type 430 Stainless Steel" is also available. Write us, or ask your nearest Armco Distributor for free copies.

ARMCO STEEL CORPORATION

ARMCO

1552 Curtis Street, Middletown, Ohio • Plants and sales offices from coast to coast • Export: The Armco International Corporation

Time for Action

In presenting the government's budget for the fiscal year 1953, President Truman did an excellent job of sugar-coating a bitter pill. Indeed there were moments when his remarks sounded as if he were trying to make the staggering size of his spending recommendations appear to be a virtue instead of a curse.

His budget message calls for appropriations totaling $85.4 billion. He asserts that every item in it has been considered carefully, thus inferring that it cannot be slashed appreciably without endangering the nation's well-being. He takes it for granted that there will be a deficit in fiscal 1953 of around $14.4 billion. He also admitted, apparently without alarm, that this deficit will lift the public debt almost to the statutory limit of $275 billion by the end of fiscal 1953.

The complacency with which he regards these stupendous figures is incredible. One wonders whether he and his economic advisers have given any thought at all to the future consequences of the unsound fiscal policies they are advocating. Have they learned nothing from the lessons of World Wars I and II?

Consider for a moment what these wars have done to the value of our American dollar. From the beginning of World War I until 1920, the value of the 1913 dollar declined from par to 50 cents. During the next 13 years it recovered slowly and painfully to a peak of 77 cents in 1933. It hovered around 70 cents until the outbreak of World War II. It was down to 55 cents by VJ Day. Since then it has declined almost steadily to its present worth of 38 cents. Even the 1939 dollar is worth less than 53 cents today.

Everybody realizes it is difficut to restore the value of the dollar except by long and painful steps. The pity is that the present administration does not even recognize any merit in even trying to halt its further decline. The President's budget means the value of the dollar will drop further.

The budget can be cut. Congress has been talking about trimming it by $7 billion or more. Let's see some real action!

E. C. Shaner

EDITOR-IN-CHIEF

MORE POWER PER MAN: Recently a lecturer in Great Britain pointed out to an audience of British industrialists that productivity per man in England and in the United States was about on a par in 1900. He went on to say that today the American worker outproduces his British cousin about 2½ to 1. Why?

There are many reasons, but one of the principal ones is that the American employer pro-

vides his employees with more mechanical aids. These aids include power and machines. The assistance in machines has been pretty well publicized, but the tremendous increase in the amount of power provided for each production worker is not properly appreciated.

In 1939 the kilowatt-hours available per production worker in manufacturing were 8608. Today that worker has at his beck and call 16,420 kwhr—an increase of almost 100 per cent in about 12 years. By 1954 he will have considerably more power at his disposal. This is a basic factor of great importance. —p. 46

* * *

SHIPBUILDING REVIVAL: When the Korean War flared, initial statements from the government emphasized tanks, aircraft and auxiliaries and practically ignored ships. It was believed that demoth-balling our World War II vessels would fulfill our needs.

Apparently this was an overoptimistic analysis. Right now we are building 35 Mariner class 20-knot cargo ships, constructing 20 tankers for private account and resuming work on 14 Mariner class ships on which construction was suspended late last year. In short, we are well on our way to a substantial revival of shipbuilding. In addition to the projects mentioned, the Navy requested the House to authorize construction of 237,500 tons of combat and auxiliary vessels.

These plans will call for a substantial volume of material and equipment. —p. 40

* * *

NEAR HALF-WAY MARK: Defense Production Administration has presented detailed figures on the progress of the expansion program necessitated by the nation's step-up of defense effort. The reported cost of plant and equipment totals nearly $10 billion and at the end of 1951 about $4,575,000,000 of this amount had been spent for facilities that were actually in place. In other words, 46 per cent of the program had been completed as of Dec. 31, 1951.

As would be expected, the status of components of the program differs considerably. One of the projects that is far behind average progress is blast furnace construction. It was 19 per cent completed at the end of last year. Certain types of railroad equipment were high at 83 per cent of completion. Much of the machinery program hovered around the 50 per cent mark. On the basis of the report, 1953 will be the big year for completion of projects. —p. 47

* * *

LIFE SPAN DECLINING? Readers of obituaries sometimes get the idea that too many metalworking executives pass away before their time. In 1949, after several prominent officials had died in their forties or early fifties, we checked th last 200 obituaries in STEEL and calculated that the average age at death was 64.2 years.

Several weeks ago *Advertising Age* figured the average age of advertising men and women whose obits had appeared in its 1951 issues. It was 57 years—a figure so low that it prompted us to check the average age of metalworking executives who died in 1951. Of obituaries published in STEEL last year, 444 included age at death. The ages ranged from 29 to 94 years and the average was 63.3 years.

The decline from 64.2 in 1949 to 63.3 in 1951 seems small percentage wise, but keep in mind the fact that in 1949 the life expectancy for males was about 65 years, while now it is somewhere between 67 and 70 years. Are weighty responsibilities in a confused world taking a heavier toll? —p. 60

* * *

SAVES TIN AND SCRAP: Another inevitable and wholly logical event has occurred. A detinning plant has been installed by a steelmaker for the first time. Weirton Steel Co. division of National Steel Corp. now is operating the new unit for the dual purpose of recovering precious tin and also scarce ferrous scrap.

Weirton's detinning facilities have an annual capacity for recovering about 300,000 pounds of pig tin. Additional tin is recovered by processing the sludge that accumulates in the plating cells of the high speed electrolytic lines. The detinned tin plate yields about 30,000 tons of bundled scrap. This is a pure gain. Tin plate scrap is not suitable for open-hearth use because the tin coating is a contaminant.

The detinning of plate and the processing of sludge are especially profitable in this period of scarcity. —p. 70

Firestone STEEL PRODUCTS SPEEDS DEFENSE SUB-CONTRACTS WITH NEW PRODUCTION LINES

Automatic Machines and Integrated Production Turn Out Large-Size Stampings in Record Time

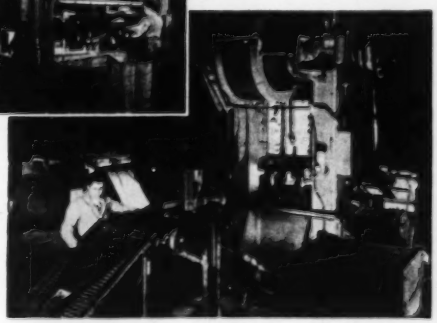
NEW automatic stamping machines are clicking out large-size stampings in record time at Firestone Steel Products, saving valuable time and money on defense sub-contracts. All production is integrated, from blanking through to painting or polishing.

Firestone's two modernized metal fabricating plants at Akron, Ohio and Wyandotte, Michigan have been completely retooled for fast, low-cost production of those heavy, large-size stampings and assemblies so vital to the speedy delivery of aircraft and ordnance equipment and accessories. If your problem is large size stampings in a hurry, wire or phone Firestone Steel Products Company, Stampings Division, Akron 1, Ohio.

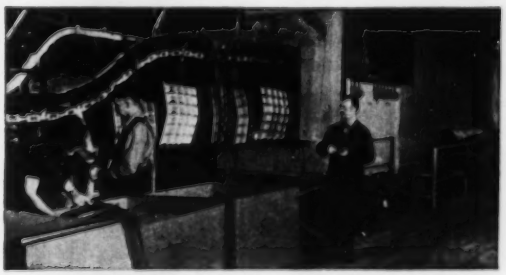
Assembly operations are closely integrated with presses at Firestone, saving time and money. As many as four operations are handled at one time on new multiple-operating presses in left background.

Fast, efficient, straight-line methods save time and handling at Firestone. Parts move from presses on rollers or overhead conveyors to next operation.

One of the huge multiple-die forming presses recently installed at Firestone for making jet engine components and parts for tanks.



One of the new completely automatic synchronized presses producing 2600 large-size blanks per hour. Steel is fed from roll at extreme left.



Washing, bonderizing, painting, and baking are handled in a continuous automatic operation, moving entirely on conveyors from the stamping line.

Copyright, 1951, The Firestone Tire & Rubber Co.

Let us help you...

BUY STEEL you need...

SELL STEEL you can't use

Plan Also Applies to Metal-Working Machinery and Equipment

Would you like help in finding extra steel? Would you like to get rid of steel you can no longer use? Here's a plan that can do both for you. We offer it as a supplement to our regular steel service because there are still many orders we cannot fill.

Despite shortages, there's a considerable tonnage of steel held by manufacturers who have no use for it. Perhaps this stagnant steel is lying dead because of design changes, or because of a switch from civilian to defense production. In any case, the holder can no longer use the steel. But chances are that your company, or some other manufacturer, can use it.

That's why we are opening the pages of our next Ryerson Pictorial, free of charge, to the classified advertisements of steel users who have stagnant steel stocks they wish to dispose of. And we will also accept ads describing metal working machinery and equipment that are no longer needed. We will run these free ads on a first come, first served basis until the available space is filled. Deadline for copy is February 18. Listings should be furnished as follows:

Steel—Give kind or analysis, shape, length, size, finish, condition (good, fair, poor) and pounds or tons involved. For carbon steel we suggest passing up any item of much less than one ton because of space limitations.

Metal-Working Machinery & Related Equipment—Give kind or type, manufacturer, capacity and condition.

Ads will be identified by number so that names will not be disclosed, and classified by State and by type of steel or equipment. Replies will be forwarded to you promptly.

Since our Pictorial is regularly received by more than 100,000 steel users in every line of business, these ads will bring about a widespread exchange of information. As a result, many companies should be able to locate needed steel or equipment and, at the same time, dispose of items they don't need. But remember, this means of getting steel requires *your* cooperation.

So make a thorough check. If your idle steel and equipment is too good to scrap, let us help you sell it. Whether you scrap or sell you are helping the defense effort by putting every pound of idle steel to work again. Send listings of your stagnant steel and equipment to the nearest Ryerson plant by February 18 for publication in our Pictorial shortly thereafter.

NOTE—This plan is designed as an exchange between steel users (not black market brokers) in accordance with Government allotments and ceiling prices.

RYERSON STEEL

STEEL SERVICE PLANTS AT: NEW YORK · BOSTON · PHILADELPHIA · DETROIT · CINCINNATI · CLEVELAND · PITTSBURGH
BUFFALO · CHICAGO · MILWAUKEE · ST. LOUIS · LOS ANGELES · SAN FRANCISCO · SEATTLE · SPOKANE

Steel Squeeze Eases

Over-all demand still exceeds supply in most products but some of the excess pressure to get on order books is melting away

THINGS are looking up for the steel buyer.

This individual, frustrated and frantic these many months, now feels life really may be worth living after all. More and more, he finds the terrific pressure for steel is evaporating.

Not in every case can he get everything he wants at the time he wants it and from the place he wants it, but he's having fewer disappointments.

What's the cause of this easing? Part of it is the improvement in effectiveness of the Controlled Materials Plan. Part of it, say some analysts, is a reduced demand for durable goods. An indisputable factor is the increasing productive capacity of the steel industry.

Points To Watch—There are no surpluses of steel, except in some cases of specialties, but some people are speculating as to how long it will be before there are surpluses. A few percentage points can be the separation between too little and too much. If demand exceeds supply by 5 per cent there's a steel shortage. Remove this 5 per cent and you don't have a shortage. Remove another 5 percentage points and you have a surplus.

Over-all there's still more demand than there is supply but some of the percentage points are melting away. Will they continue to melt away or will the defense program snowball and reverse this trend? Look at some reports from the metalworking field:

Too Much Steel—An automotive steel buyer in Detroit says, "We have to make some important decisions right away. We just received our second-quarter allocations. Up to now we have been sensitive about our ordering. After we placed our orders for first quarter we saw we were going to be taking in more flat-rolled steel than we could use. Some of the mills say if we don't order as much as we have been we may lose our position with them. So what are we going to do? Gamble that we can get more steel if we need it, or go on taking more than we can use?"

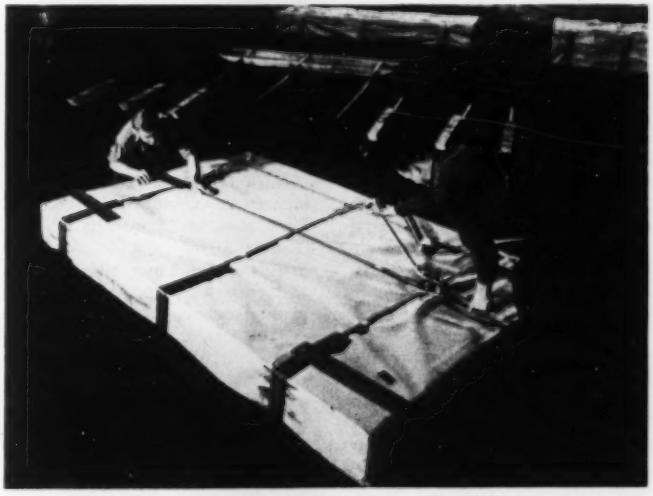
Automotive supplier companies which have been dependent on their customers for steel suddenly won't take any. This happened overnight and just this month.

Price Conscious—Among Detroit warehouses competition is getting strong, and there are indications that in the very near future a single price probably will prevail on nearly all warehouse products.

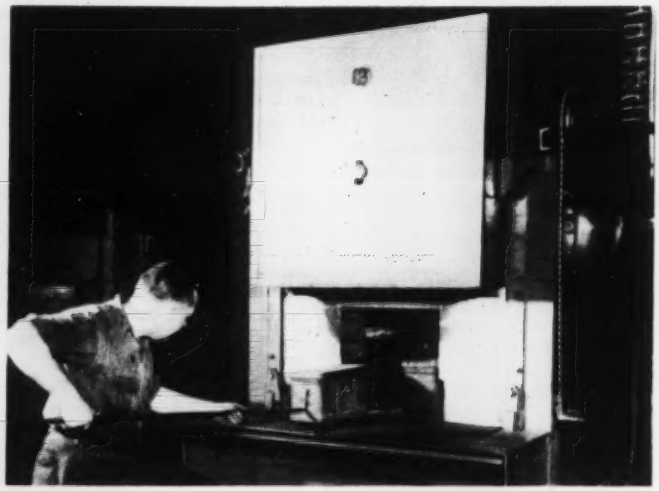
Here is a demand-supply picture in Detroit: Plates are plentiful from warehouses in 1-inch and lighter gages. Cold-rolled sheets in all gages are in oversupply both at warehouses and at consumers' plants. Says one large consumer of cold-rolled sheets: "Unless we make some changes quick they'll be running out our ears." Hot-rolled sheets recently have become much easier and a warehouse says it can furnish any gage in any "reasonable" quantity. Structurals are "pretty easy" in the bar sizes 3 inches and lighter; those over 3 inches are still "pretty tough" but improving. Hot-rolled carbon bars 1 inch and lighter are readily available, although those over this size are "very critical." Cold-rolled bar flats are still critical in large sizes, but cold-rolled rounds 3 inches and lighter are easy.

A Big Wheel—Admittedly the Detroit area is probably the extreme example that can be pointed to. Government restrictions on materials, particularly copper, have cut severely into Detroit's principal product, automobiles. But in trying to determine how much this will free up steel, remember the automotive industry is the nation's largest consumer of steel.

Detroit isn't the only place where there's a lessened pressure for steel. At Chicago, F. J. Heaslip, purchasing agent, Fairbanks, Morse & Co., says as to steel supplies, "The situation looks much better for the second quarter." He sees an easing in heavy and light plates, hot-rolled sheets and silicon sheets. The easing is the start of



DEMAND FOR STEEL DELIVERY IS STILL STRONG
. . . but some of the pressure is off



DENTAL HOT-BOX: Two furnaces like this General Electric box type are forging more uniformly hard dental tools at a faster rate at the S. S. White Dental Mfg. Co., Philadelphia. The 220-volt model has a temperature rating of 1850 degrees F and a capacity of 200 forgings a day. Electric heat is better than previous methods because it has less than 15 per cent variation, firm engineers say

a trend he thinks will characterize the rest of the year. It is resulting, he believes, from a lesser demand from holders of liberal CMP tickets, and a reduced need for steel for actual production.

Definite Trend—Another Chicagoan, Pierce Richie, vice president-purchasing, Oliver Corp., notes an easing in strip, hot and cold-rolled sheets and light plate. He expects though a continued tight situation in heavy bars and forging quality billets and bars.

A big Chicago steel warehouse commenting that steel supplies are easier, expressed the belief that the easing results to some extent from supply catching up with demand in a lot of goods. Also, high-level steel production and limitations on output of civilian goods are factors, it opines.

A steel company sales executive in Chicago reveals the easing in demand is being felt all the way back to the steel producer.

East Feels It Too—On the East Coast there are definite signs of some over-all easing in demand for steel. In that area, demand has lightened for wire, wire rods, narrow cold-rolled strip, hot-rolled strip, cold-rolled sheets, furniture tubing, silicon sheets, enameling sheets, and straight chromium stainless sheets. Some mills even will have more galvanized sheets to offer by March.

In the East, standard structurals and plates 3/16 to 1/4 inch are expected to be in easier supply during the second quarter.

With some warehouses and consumers in the East, the tightest product is large bars.

Bethlehem Pacific Sets Record

Bethlehem Pacific Coast Steel Corp., operating at an average of 106 per cent of theoretical capacity, broke all records in production in 1951, turning out 830,846 net tons of ingots at its three plants. That was 32 per cent higher than the best previous record of 627,650 tons in 1950.

U. S. Halts Sale of Reds' Mill

Treasury Department is prohibiting the sale or other disposition of a steel mill presently located in the U. S. and belonging to Czechoslovak interests. The mill, manufactured in the U. S. for Banksa e Hutni Spolecnost and other Czechoslovak interests is designed to produce steel strip, steel sheet and light plate. The component parts of the mill are located in various warehouses, including those of United Engineering and Foundry Co., Newcastle, Pa. and Youngstown, O.

Finished Steel Shipments in 11 Months Hit Peak

MORE FINISHED steel was shipped in the first 11 months of 1951 than in all of 1950 or any other year, says American Iron & Steel Institute.

The total of 72,491,400 net tons in 11 months was 10.7 per cent greater than in the same 1950 period and 259,000 tons above the total for all of 1950.

More for Most—Thirteen of 20 industrial classifications received more steel in 11 months of 1951 than in all of 1950. Five other groups obtained more steel than in 11 months of 1950. Auto and appliance makers obtained less steel in the 11 months than in the same part of 1950.

Warehouses received more steel than any other category, obtained more than 13.1 million tons in the 11 months, or 18.4 per cent of the total. The automotive industry received almost 12 million tons, against 13.3 million in the same part of the preceding year. Construction, including plumbing and hardware, obtained more than 11.6 million tons of steel by direct shipments from mills, practically the same as in all of 1950. Shipments to railroads totaled nearly 5.4 million tons, exceed the shipments of any full year since 1944.

The Iron Fist—The largest percentage increase was in shipments of steel for guns, tanks, ammunition and similar direct military goods. The total of nearly 1,065,000 tons in 11 months was more than five times as much as in all of 1950. Still, in November only 2.2 per cent of total steel shipments were for direct military.

Shipbuilding obtained 808,000 tons in 11 months; aircraft 138,000 tons. Oil and gas drilling received 767,000 tons in the period, or 144,000 tons more than in all of 1950 and exceeding any past full year except 1947. Appliance makers got 1.7 million tons, against 1.9 million in 11 months of 1950.

High Military Output Despite New Budget

The $9.3 billion budget cut in military hard goods and construction spending for fiscal 1953 won't show up until late 1954. Count on peak defense output for two years

EXPECT a high plateau of military production over the next two years—even though President Truman's budget calls for a $9.3 billion cut in new government orders for military hard goods and construction in fiscal 1953.

The clue to the paradox is lead time. Some of the funds voted for fiscal 1951 military spending have not yet been dispersed. Even when the government reorders an existing type plane, 24 months on the average elapse from the date of order until the date of delivery. Lead times are comparable on many other military hard goods.

Backlog—So, well into calendar year 1954 metalworking will be producing on orders to be paid from funds voted in fiscal 1951 and 1952 when appropriations far outdistanced spending. The significant figure that will affect production in the next 24 to 28 months is the $61.7 billion voted in fiscal 1952 for military construction and hardware, not the $52.4 billion requested for fiscal 1953. Of those totals, $33.4 billion will be for hard goods in fiscal 1952; $24.2 billion in 1953. The latter appropriations would affect production in late 1954, 1955 and 1956.

Biggest cut in the new budget is for army weapons, down almost 90 per cent from $4.3 billion for fiscal 1952. The major curtailments will be for tanks, other combat vehicles and artillery. Orders for small arms and flame throwers will rise. Orders for trucks and other noncombat vehicles will be slashed from 1952's $1.4 billion to $166 million. Electronics and communications equipment orders will be halved, from $550 million to $226 million. Orders for airplanes will drop from 1952's $14.9 billion to a predicted $14.1 billion in 1953.

A Surprise—Although the airplane cuts are the mildest—only about 6 per cent — they have caused some of the greatest surprise, since we plan to expand our present 90-wing air force to 143 wings. The cuts are not surprising, says Air Force Secretary Thomas K. Finletter. "Expenditures now are higher than they will be in about two years because we are going through the phase where we are building the capital of our armament. Once we have it, we can level off at replacement and maintenance costs."

Mr. Finletter indicates that major aircraft advances coming up will make our entire interceptor fleet able to fight in any light and in any weather. Heavy bombers coming up will be the B-52, an eight-engine sweptback wing jet plane, and the B-60, also a sweptback wing aircraft with eight jet engines. The medium bomber fleet, now composed of B-29s and B-50s, will eventually be supplanted by the new B-47 sweptback wing, six engine ship.

Alcoa, Reynolds Get Big Presses

Aluminum Co. of America is installing a 13,200-ton extrusion press at its Lafayette, Ind., works.

Leased from the Air Force, the press will be used to produce larger, lighter, more intricate aluminum shapes for aircraft and other industries. Ribbed airplane wing panel extrusions may be made in lengths up to 90 feet.

In another action regarding aluminum and presses, the Air Force has awarded a multi-million dollar contract to Reynolds Metals Co. involving the construction of a new building at its Phoenix, Ariz., plant.

Nickel Puts Quench on Furnaces

Furnace builders are turning the heat on NPA to allocate more nickel to them. Where's the metal to come from? The Industrial Furnace Manufacturers Association, meeting in Pittsburgh last week answered that question by pointing out the folly of allocating scarce materials for finished tanks, guns and planes and ignoring legitimate needs of manufacturers who make the tools to produce the defense materials.

In 1951 the industry consumed nickel at the rate of about 7 million pounds. Scrap provided a large portion of this figure. This year, first quarter NPA allocation is 300,000 pounds. Only 10 per cent of the industry's nickel requirements is being supplied from scrap. Diminishing availability of scrap will push this figure even lower—down to 5 per cent in some areas.

New president of IFMA is J. J. Walker, general manager, C. I. Hayes Inc., Providence.

Cue for Machinery Makers

Allotments to the construction machinery makers will be cut 10 to 20 per cent from first quarter 1952 levels in the second quarter 1952, says the NPA. The reduction

AN AMERICAN SAVAGE: North American Aviation's turbo-prop attack bomber, XA2J-1 Savage, is in late development stage as the nation's airpower buildup evens off at high levels. The carrier-based bomber can carry bomb loads of 10,000 lb at speeds of more than 400 mph

is prompted by a slowdown of the nation's industrial plant expansion expected in the second quarter.

Allotments for the third and fourth quarters of 1951 and first quarter 1952 were about the same and allowed the industry to operate at nearly 75 per cent of peak plant capacity.

Construction machinery makers aren't asking too loudly for changes in pricing controls. The industry advisory committee says that in general the industry is pricing satisfactorily under CPR 30. But, they say they'll need some concessions if steel prices rise.

Cleaning Up on Air

New uses and greater public acceptance promote the industry making electrical air cleaners

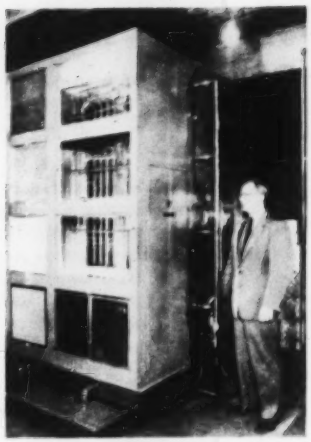
YOU CAN live 30 days without food, 7 days without water, but you cannot survive 7 minutes without pure air. Increasing public acceptance of this fact is today providing a shot-in-the-arm to our rapidly enlarging electrostatic precipitator industry.

Beginning from scratch 15 years ago, its sales in 1950 rose to $6 million, and last year reached $7 million. Producers say that business this year should increase about 15 per cent over last year and by 1955, $9 million in sales is not unreasonable to expect. These figures apply only to the segment of the industry producing precipitators for cleaning air breathed by humans.

The Other Half—Other half of the field embraces the production of cleaners for large industrial applications. They had sales of $7.5 million in 1950, $16 million last year and entered 1952 with a $15 million backlog.

Ever expanding uses of electrostatic cleaners include department stores, private homes, hotels, chemical and pharmaceutical manufacturers, hospitals, power plants, precision instrument makers, guided missile plants, foundries, and both ferrous and nonferrous rolling mills for their motor rooms and other auxiliary equipment. Private home sales skyrocketed over 350 per cent during the last two and one-half years.

Industry's Smoke Eaters—Industrial applications include the cleaning of flash roaster gases coming from the roasting of zinc pyrites, which after cleaning is used in making sulphuric acid, and a unit for eliminating coolant oil mist and smoke created by high speed cutting, grinding and machining operations which, if neglected, presents a safety hazard.



ELECTRIC AIR FILTER
. . . finding ever-expanding uses

Research is now underway with the Defense Department for super-efficient electrostatic units for the filtering of harmful contaminants like radioactive particles and the many viruses used in biological warfare. Any size particle down to 1/1000 of a micron can be effectively removed by the filtering process.

Going Far—E. W. Meyers, Jr., president of Pittsburgh's Trion Inc.—producer of both domestic and commercial type cleaners—says that the industry today is "at the point where mechanical refrigeration was 20 years ago and ultimately will go just as far."

Delivery on commercial units is generally from two weeks to two months due to stocking of standard sizes; on the custom-built industrial jobs, you must wait anywhere up to a year.

Pollution Problems Aired

Two more steps are being taken in the drive to purify the air, a problem as serious as the pollution of our streams (Jan. 21, p. 45).

The Air Pollution & Smoke Prevention Association of America has studied the problem of relaxing municipal anti-smoke ordinances to permit burning of junked automobiles to obtain critical scrap metal. Robert T. Griebling, executive secretary of the association and editor of its magazine *Air Repair*, states that most communities are against any relaxation.

Another move in industrial air purification is going on in Weirton, W. Va., where Weirton Steel Co., division of National Steel Corp., is conducting an air "needs analysis" program. Once these needs are determined, the company will correct them on a "first things first" basis.

Alternates Succeed in Hardware

Yale & Towne Manufacturing Co. says its use of alternate metals is a success. Cast iron and steel are replacing brass in the manufacture of tubular locks, screen door closers and hardware products for doors and windows. Any sales resistance to its alternate-metals products, says Yale & Towne, is now declining.

Labor Shortage: Not So Bad

Labor supplies are getting a little easier, reports the Labor Department.

A January classification of 174 major areas shows more manpower is available in 16. Only two areas have tighter conditions. Detroit remains the most dramatic center of unemployment, although national unemployment is still low.

This week a special government task force will investigate the Detroit situation to find the types and extent of idle plant facilities in Detroit, the categories and skills among the unemployed and the contracts available for placement in southern Michigan.

The number of workers in industry, commerce and government reached a record high of 47.5 million in mid-December, after a seasonal gain of almost 700,000 from the November level. The 1951 average of 46.4 million nonfarm employees was the highest achieved in any year and almost 2.5 million higher than 1950. Manufacturing employment in December, at 15.9 million, remained 85,000 above a year ago.

Starting From Scratch

Few new companies are being formed today, but chances for success after a year are good

ENTREPRENEURS of new metalworking companies find that starting a business from scratch is no cinch today. But once they've survived the first-year gaff, chances for success are good and future opportunities numerous.

Fewer new businesses were added to the 4 million existing in 1951 than in any previous postwar year —despite a decline in failures for the second consecutive year.

Required—Fabricators of specialty products have the best chance for survival, says Marshall Wagman of Marsam Corp., McKees Rocks, Pa. Jig and fixture men with experience and willing to work long hours to get their companies started find Detroit's environment reasonably conducive to success. Ability to perform special operations on close tolerance work appears to be a universal ticket to a fast business start.

"If you aren't familiar with running a business, get dependable advice," cautions a Cleveland counsel for a number of new companies. "Production men may not know billing procedure, can forget details like insurance, and often don't line up enough working capital to meet payrolls till collections begin." The latter often must turn to the deadly quick-money, high-interest parasites.

Machinery — In buying production equipment, most new companies pick up used or rebuilt machinery, unless it must be specially designed. A Cleveland outfit rebuilt and retooled a $150 lathe that turned out $10,000 of work in 3½ months.

Getting employees, surprisingly, is not a problem. The small shop's advantages of personal treatment, willingness to hire older workers and opportunity for closer personal relations with fellow workers helps.

Materials problems don't hurt new companies that are service organizations. They simply pass on CMP ratings of customers. Consensus among new companies is they're getting a fair shake from NPA and OPS.

Defense work is a big factor in sustaining most new firms—as subs for specialty items particularly. Aggressive and looking for volume, a Massachusetts outfit is expanding capacity for defense, but trying to develop its own products.

How One Small Company Got Started

HOW DOES a small, new company get started these days?

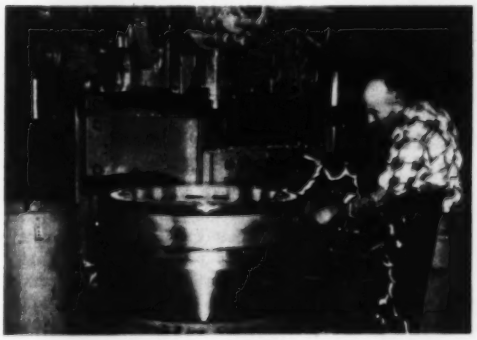
A case study of Pryor Mfg. Co., Mansfield, O., may give some of the answers. Technically, Pryor is not a new company since it was organized in 1942. But it was inactive after World War II and since reactivation has been producing only since last November.

How It Began—Months ago, the U.S. Air Force recommended to each of the prime contractors in the wheel and brake industry that it subcontract a percentage of its military production to other manufacturers near the prime contractor, yet outside critical labor areas. B. F. Goodrich Co. was one prime so advised and it first considered Barnes Mfg. Co., also of Mansfield, as its secondary source of manufacture. But Barnes had 35 per cent of its capacity tied up in defense work, so Barnes officials suggested revitalizing Pryor Mfg. Co.

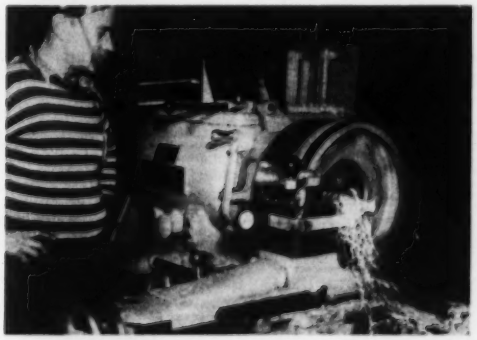
Pryor is an independent firm formed during World War II by the present Barnes officials. Although dormant, Pryor had the advantage of having 30,000 square feet of floor space available and the background of processing magnesium. Barnes also agreed that Pryor could draw upon it for personnel and technical knowledge.

Hunt for Tools—The Pryor company, headed by President M. H. Pryor, then set about getting tools and equipment. For possible aid to the firm, Air Materiel Command opened its inventory of tools held in reserve. Pryor accepted any equipment it believed it could convert. Single purpose machines were converted to general purpose tools. Into the open market went the company to find jigs and fixtures to convert those machines. Goodrich furnished detailed drawings and other assistance.

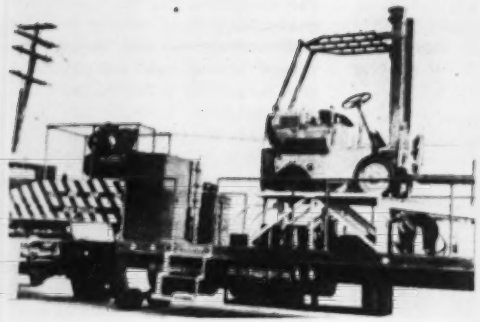
Given government approval to disperse funds on July 31, 1951, Pryor produced its first finished wheel and brake, for the B-47, last Nov. 10. When in full production, Pryor will employ an estimated 150 persons at its Mansfield plant.

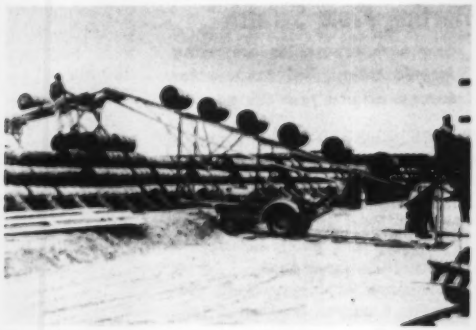


BULLARDS FOR PRYOR FROM AIR FORCE POOL
. . . added attachments mean landing gears for B-47s



1917 MODEL GISHOLT LATHE AT PRYOR
. . . "take it and get going on production"





BOTTOMS UP IN THE AIR FORCE: Air Materiel Command increased efficiency from the bottom up through surveys and suggestions from all levels of workers. At left, rearrangement of tools saves time and steps in greasing, inspecting and minor repairs at Cheli Air Force Specialized Depot, Maywood, Calif. Portable conveyor rig instead of cranes doubled output in stacking 55-gallon oil drums after unloading from trucks at Cheli Air Force Depot, right

Shipbuilding: It May Soon Be on the Ways

WE MAY be about to see the start of a shipbuilding boom, although far smaller than that of the liberty-ship days of World War II. Vessels now under construction are getting materials quicker, while obsolete vessels are being taken out of moth-balls and reconverted.

More Steel—Carbon steel allotments totaling 120,100 tons are designated for shipyards during the second quarter of 1952, says the Maritime Administration, Commerce Department. Of this, 49,660 tons will go to seven shipyards now building 35 Mariner class 20-knot cargo ships for the government. Another 67,340 tons is earmarked for 26 tankers now under construction for private companies. Second quarter allotments, says the Maritime Administration, will be sufficient to resume work on 14 Mariner class ships whose construction was suspended last October because of steel shortages.

A greater indication of government interest in shipbuilding is the $150 million Navy shipbuilding and conversion bill placed before the House of Representatives by House Armed Services Chairman Carl Vinson (Dem.-Ga.) The bill would authorize appropriations to construct another 237,500 tons of combat and auxiliary vessels. Included in those are two aircraft carriers—a 60,000 ton Forrestal Class vessel and a small 16,000 ton escort type—and four submarines, also the Navy's second atomic submarine and first radar picket sub.

Conversion—The modernization and conversion program includes the conversion of two aircraft carriers of the Essex Class and modernization of two light cruisers and six destroyer escorts.

Contracts awarded by the government, in excess of $250,000 are in the table below.

PRODUCT	CONTRACTOR
Milling Machines	Cincinnati Milling Machine Co., Cincinnati
Turret Lathes	Gisholt Machine Co., Madison, Wis.
Range Finders	Eastman Kodak Co., Rochester, N. Y.
Base Fuses	Lion Mfg. Corp., Chicago
Smoke Shells	Bosco Mfg. Co., Indianapolis
Boosters	The Schaible Co., Cincinnati
Headsets	Dictograph Products Inc., Jamaica, N. Y.
Terminal Equipment	The Gamewell Co., Newton Upper Falls, Mass.
Electron Tubes	Radio Corporation of America, Harrison, N. J.
Electron Tubes	Sperry Gyroscope Co., Great Neck, N. Y.
Reperforator Transmitters	Teletype Corp., Chicago
Control Boxes and Generators	Jack & Heintz Inc., Cleveland
Dynamotors	Wincharger Corp., Sioux City, Iowa
MPTS for Fuses	Silex Co., Hartford, Conn.
Trailers	John R. Hollingsworth Corp., Clifton Heights, Pa.
Steel Landing Ships	Inland Dock Co., Kingston, N. Y.
Aircraft Assemblies	North American Aviation Inc., Port Columbus, O.
Aviation Spare Parts	Bendix Aviation Co., South Bend, Ind.
	General Electric Co., Schenectady, N. Y.
	Allison Div., General Motors Corp., Grand Rapids, Mich.
	Douglas Aircraft Co. Inc., Santa Monica, Calif.

Army Metal Savings Substantial

Conservation of critical materials by the Army will extend the available supply and keep Army demands on the national stockpile at a minimum, says Secretary of the Army Frank Pace Jr. A substantial savings for the second quarter of fiscal 1952 has been accomplished by the conservation program begun in September, 1950, states Secretary Pace.

Figures released for the second quarter indicate that copper leads the way with a savings of 4,393,000 pounds. Nickel is next with 225,000 pounds followed by zinc with 200,000, aluminum 122,000.

These savings are being accomplished by substitution of less essential materials and by design simplification.

Midwest Contracts: $45 Million

Almost $46 million in Army Ordnance contracts were placed in the Chicago Ordnance District during the first half of January, says Col. Robert K. Haskell, district chief.

File in Triplicate for NPA

A new procedure that will require applicants to file in triplicate when seeking priorities, materials or any other assistance "is expected to save two to ten days' time in processing such requests," says NPA.

NPA Vetoes Most Cases

National Production Authority denied 73.4 per cent of 507 applications for allotments of controlled materials in the first quarter of 1952 to build commercial, religious, entertainment, community structures, says Commerce Department.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

ALUMINUM CLOSURES—Amendment of Jan. 17, 1952, of NPA Order M-26 sharply reduces use of aluminum closures for packaging of such products as wine, distilled spirits, nonalcoholic beverage drinks, cosmetics and chemicals. The amendment was effective Jan. 17. Also on Jan. 17, Interpretation 1 to M-26 was revoked; contents of this interpretation are now embodied in th amended M-26.

STEEL DISTRIBUTORS—Direction 1 to NPA Order M-6A requires steel distributors to give preferential treatment to orders from machine tool builders, and for military and atomic energy projects. This direction was effective Jan. 21, 1952, and expires on June 16, 1952.

IRON, STEEL—NPA Order M-47, which limited iron and steel use during the second quarter of 1951, was revoked Jan. 22, 1952.

CANS—Amendment of Jan. 22, 1952, of NPA Order M-25 permits an increase in the quantity of cans that may be used to pack four low-cost basic food products and two essential nonfood products.

COPPER—To bring its copper order (M-11) into harmony with the Controlled Materials Plan, the National Production Authority on Jan. 23, 1952, made a revision in M-11, revoked Directions 2, 3 and 4 to that order, and issued Direction 5.

ALUMINUM—NPA Order M-5 was amended Jan. 23, 1952, to adapt it to the Controlled Materials Plan. Directions 1, 2 and 3 to that order also were revoked. Simultaneously NPA announced that holders of CMP allotments will, upon application to the NPA Aluminum and Magnesium Division, be guaranteed positions on a mill schedule.

Controlled Materials Plan

WATER WELL DRILLERS—Direction 4 to CMP Regulation 6 requires water well drillers to apply for allotments of controlled materials each calendar quarter. Deadline for submitting CMP-4C applications for second quarter is Feb. 15. Direction 4 was issued Jan. 17, 1952, and made effective on that date.

DELIVERIES—Five obsolete directions to three Controlled Materials Plan regulations were revoked Jan. 18, 1952. They are: Direction 7 to CMP Reg. 1. Direction 1 to CMP Reg. 3. Direction 2 to CMP Reg. 3. Direction 3 to CMP Reg. 3. Direction 3 to CMP Reg. 6.

Price Regulations

ALUMINUM — Revision 1 of Ceiling Price Regulation 54 increases ceiling prices for a relatively few grades of aluminum scrap and secondary aluminum ingot to correct disparities in price between these and other grades. Revision 1 was effective Jan. 16, 1952.

MACHINERY—Amendment 30 to Ceiling Price Regulation 30 (machinery) requires manufacturers who perform certain installation and erection services in connection with the sale of equipment to price such work under CPR 93, which covers construction and related services. Amendment 30 was effective Jan. 28, 1952.

Research Goes Military, Official Warns

WHERE are we going in research?

According to Edwin A. Speakman, vice chairman of the Defense Department's Research & Development Board, that question really means: Where are we going in military research? For the services of two-thirds of the nation's scientists and engineers are being engaged by the Department of Defense and the Atomic Energy Commission in a military research and development program costing the American taxpayer nearly $1.5 billion, a sum greater than ever before in history.

Sound of Alarm—In speaking to the American Patent Law Association in Washington, Mr. Speakman warned that the size of the program gives rise to grave dangers inherent in the increased governmental regimentation of scientific research and the exhaustion of our basic store of knowledge.

While pointing out the dangers, the vice chairman admits that some military developments, such as radar, have eventually had commercial applications. Yet, he believes that such by-product benefits to the civilian economy are too hit-and-miss.

Indication — Indicative of the military interest in research is the establishment of an office for Research & Development in the Office of the Army Chief of Staff to direct and co-ordinate the Army research and development program. Maj. Gen. Kenneth D. Nichols will head the new office as chief of research and development and personal assistant to the chief of staff on research matters.

ELECTRICAL MAGIC: By creating an electrical model of a new design for a fractional horsepower motor, the "Moneca" (MOtor-NEtwork-CAlculator), developed by Westinghouse engineers, does in a few hours what technicians with slide rules formerly took days to do. "Moneca" varies the model's elements and indicates the actual motor effects of temperature, overloading or a short circuit

ASM To Meet This Week

Metals problems in a garrison state economy will get a thorough examination when the American Society for Metals convenes for its first mid-winter meeting Jan. 31-Feb. 1 at Hotel William Penn in Pittsburgh. Executive Secretary W. H. Eisenman says the the meeting will be open to all metalworking engineers.

Speakers from Case Institute of Technology, Wright-Patterson Air Force Base and Vanderbilt University will open the Wednesday session, offering papers on characteristics and performance of titanium. Afternoon discussion will consider temper embrittlement in plain carbon steels, pure iron embrittlement in wet and dry hydrogen, overcoming rheotropic embrittlement and metallurgical significance of the pickling test for tin plate steels.

Wednesday evening topics scheduled are high temperature and oxidation. On Thursday, papers will be devoted to nonferrous alloys in the morning; transformations and grain growths in steels in the afternoon.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Washington's belief that steel wage and price increases are certain is based on precedent, current economic needs and off-record statements of Administration leaders

WASHINGTON'S expectation on the pending steel wage case: It will be settled by allowing both substantial wage and price increases.

This conclusion is based on precedent, current economic needs, and off-the-record statements of top administration spokesmen.

Basis of Deduction—As to precedent, the same issue came up in late 1950. Then the steelworkers got a wage increase, and Alan Valentine tacitly approved a 5.5 per cent steel price increase to permit it. As to current economic needs, Washington recognizes that the steel industry's profit situation must be left unimpaired to enable it to continue paying big income taxes and to finance its expansion program to completion.

As to what top officials are saying—they are not in line with OPS Boss Michael DiSalle who is resigning and who endorsed the CIO contention that wage demands may be met out of profits, without increasing prices.

Daisy Chain—When the Steel Wage Panel completes its hearings (they are to be resumed in New York Feb. 1) it will report to the Wage Stabilization Board. The Board then will report its recommendations to President Truman. The report, it is implied, will be written with the usual conference approach, so that when it arrives in final form at the White House it will be in line with the President's thinking. Then, after the President announces his approval, the office of Economic Stabilizer Roger L. Putnam will be open for price relief petitions from steel companies.

In the meantime, OPS is writing a Capehart adjustment order for steel prices. It will be ready "in a couple of weeks." The order will permit raising steel prices to include all cost increases from pre-Korea through July 26, 1951. OPS hopes the relief permitted will enable the steel industry to grant higher wages now. That hope does not seem to be reflected in other high government echelons. But there is substantial reason to expect the industry will receive equitable treatment.

Loans: RFC, SDPA in Action . . .

To get a government loan under Section 714 of the Defense Production Act as amended in 1951 you must specifically signify this desire when filing a loan application with any of the regional offices of the Reconstruction Finance Corp. Otherwise RFC, under its present regulations, will consider the application only under its two previous authorizations—Section 4 (a) of the RFC Act and Section 302 of the original Defense Production Act.

The 714 authorization creates a liberalized loan setup for "small business"—which term, by any of the definitions now current in the government, may be construed to include all business organizations in this country other than 100 or 200 so-called "giant" corporations. Under 714, loans may be made for virtually any legitimate business purpose: Purchase of new equipment, plant expansion, research and development work, provision of working capital, etc.

Shuffling—Here's what happens when a business loan application from a regional office gets to RFC in Washington: If the prospective borrower signifies that he desires consideration under 714, RFC refers the application to the Small Defense Plants Administration.

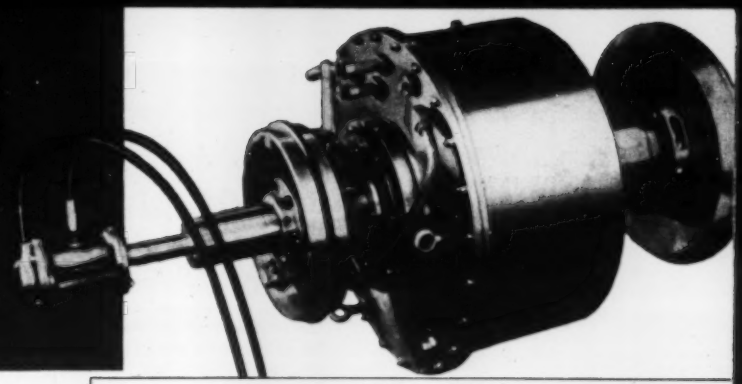
In the meantime RFC considers eligibility of the loan under 4(a) and 302—and approves the loan under one of these authorizations if permissible. If the application is disqualified under 4(a) and 302, and the SDPA grants approval, it then is considered under 714.

Practicality—Under this setup, of what practical use is the SDPA recommendation? Answers: 1—Under the law, Section 714 loans must have the approval of the SDPA. 2—RFC has $100 million which may be used only in making 714 loans recommended by SDPA.

Prospective borrowers need not contact SDPA at all; they need only file with RFC. But it always is advisable for small firms to make and maintain contact with the SDPA in view of the wide powers that agency has in assisting small business in many ways. It soon will be much easier to make such contacts; SDPA is preparing to establish regional offices in Boston, New York, Philadelphia, Richmond, Atlanta, Cleveland, Chicago, Minneapolis, Kansas City, Dallas, Denver, San Francisco and Seattle.

HERE'S the governmental chain of command that will be followed in the steel wage dispute: A six-man panel has heard the union's case, will next listen to the industry's arguments. The panel's findings will be passed on to the Wage Stabilization Board. WSB will study the findings and make recommendations to President Truman. After presidential approval, the decision (to grant wage raises) will go to Roger Putnam's Economic Stabilization Agency for execution. ESA will then entertain petitions from steel companies for price boosts.

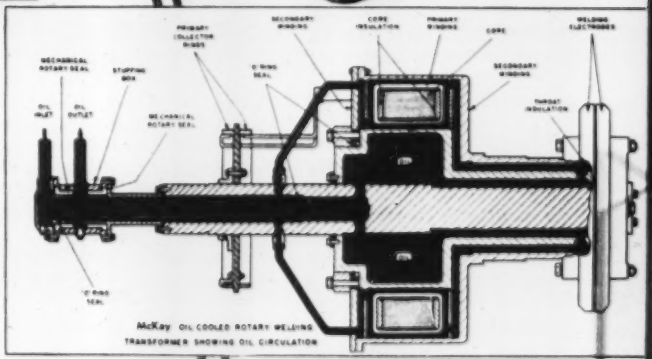
McKay Boosts Operating Efficiency and Reduces "Down Time" with New Forced Oil Cooled Rotary Transformer



There has always been a demand for a trouble-free rotary transformer for resistance weld tube mills. McKay has recently acquired the exclusive right to design and manufacture the rotary transformer originally built under the Thomas M. Hunter Patents.

The **New Design** incorporates **Forced Oil Cooling** with the following advantages:

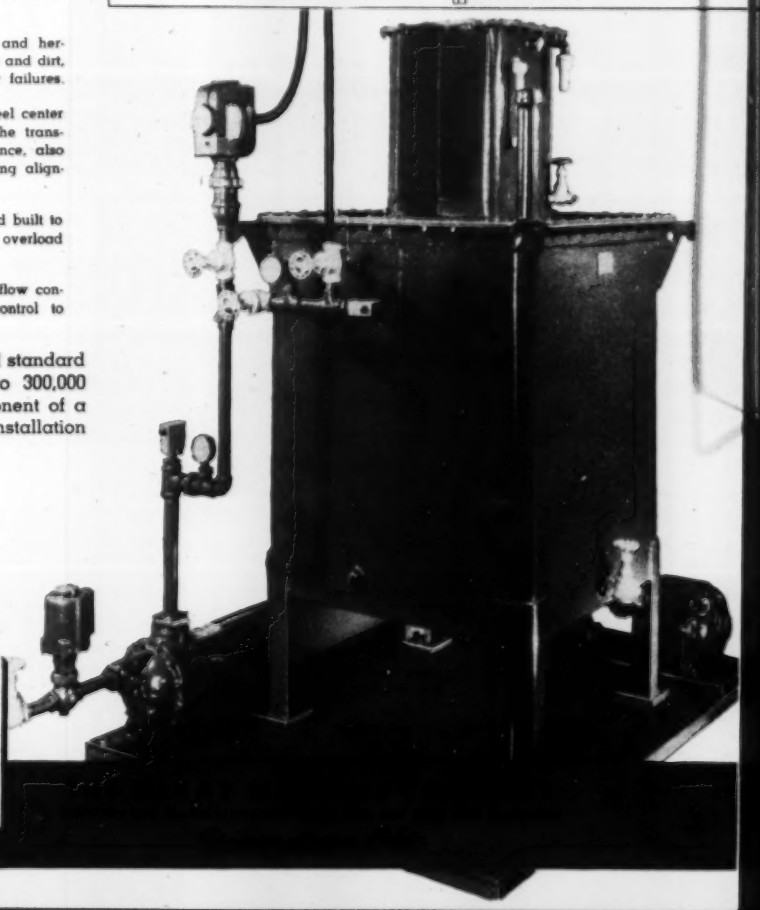
1. **Oil**, which is a non-conductor, is forced into direct contact with the high voltage primary and the inner and outer (copper) secondary castings — thereby removing heat at its source and increasing overall efficiency.
2. Entirely enclosed design of transformer and hermetically sealed oil tank exclude moisture and dirt, thereby eliminating the chief causes for failures.
3. Mechanical loads are all referred to a steel center shaft which extends the full length of the transformer, thereby maintaining perfect balance, also insuring maximum rigidity and maintaining alignment of electrodes.
4. Designed exclusively for tube mill use and built to operate at 100% duty cycle with generous overload capacity.
5. Automatic temperature control of oil and flow controls are interlocked with tube mill control to provide fool-proof operation.



McKay OIL COOLED ROTARY WELDING TRANSFORMER SHOWING OIL CIRCULATION

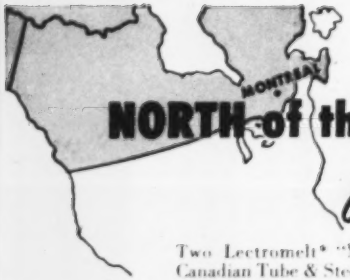
The rotary transformer is built in several standard sizes covering a range from 22,000 to 300,000 amperes, and is available as a component of a complete tube mill or separately for installation in existing tube mills.

The rotary transformer and oil cooling system is completely covered by U. S. and Foreign Patents issued and pending.



MORE MACHINE

McKAY



NORTH of the border...it's Lectromelt, too!

for fast low-cost melting

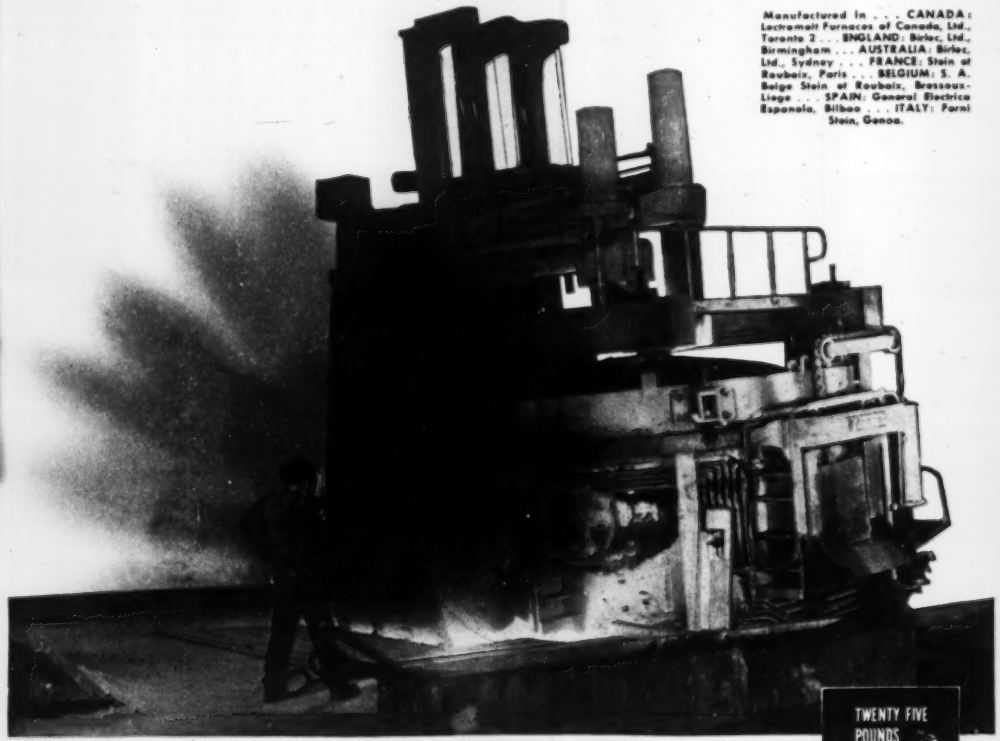
Two Lectromelt* "M-T" furnaces give Canadian Tube & Steel Products, Limited, of Montreal laborsaving top charging that spells major economies in metals melting.

Canadian steel men have known Lectromelt for years—recognize that Lectromelt furnaces give you all these features:

- Top-charging design that saves man-hours, cuts electrode consumption, saves power, lengthens lining life.
- Counterbalanced electrode arms.
- Power supply and regulation equipment engineered for every installation.
- Separately mounted roof lift and swing mechanism.
- Side-mounted tilting mechanism.
- Completely factory-assembled and mechanically operated.

A furnace with all these features will cost a lot less in the long run. Pittsburgh Lectromelt Corporation, 323 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . AUSTRALIA: Birlec, Ltd., Sydney . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Brassoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa.



*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

WHEN YOU MELT... *Lectromelt*

Iron Ore: Robbing Peter to Pay Paul

Reduced shipments of iron ore to West Germany from Sweden result from competition among western allies for materials. IMC tries to ease the shift in trade winds

SWEDEN is exporting 5 million tons of iron ore to West Germany this year contrasted to 8 to 10 million tons annually pre-war. This is one example of the revised trade patterns which have developed since Korea, based largely on increased demand from the U. S.

Sweden can't ship more iron ore to Germany because the U. S., and to a lesser extent Britain, take a good deal of exportable Swedish production. West Germans claim this hinders German steelmaking.

Panacea for Panic—When, early in 1951, the U. S. declared its intention of buying billions of dollars worth of raw materials, western European industrial countries went into near panic. U. S. buying of the total free world production skipped upward from 1949 to 1951: U. S. took 36.9 per cent of the total production of tin in 1951 compared with 28.8 per cent in 1949, 72.6 per cent of the lead in 1951 compared with 63.3 per cent in 1949, 52.1 per cent of aluminum ore against 37.4 per cent and 43.9 per cent of the zinc against 39.6 per cent. Panic was averted through co-operation, implemented by the International Materials Conference (IMC) which in a quiet way helped get raw materials where they were most needed.

The IMC with its seven commodity commissions now makes quarterly allocations of copper, zinc, lead, sulphur, cotton and cotton linters, tungsten, molybdenum, manganese, cobalt, nickel, and wood pulp. Though not binding on any government, the IMC's recommendations are heeded in most cases. Some believe it's time for the IMC to tackle the difficulties in the field of raw materials for steelmaking.

IMC Allocations Accepted

The Tungsten-Molybdenum Committee of the International Materials Conference announces that its member governments have accepted its recommendations for a plan of distribution of tungsten and molybdenum ores, concentrates, and primary products for the first quarter 1952. This was the third consecutive quarter for which these materials were allocated by IMC.

Italians Get Fourth Installment

The MSA has granted $3,952,000 to the FINSIDER group in Italy, the fourth installment to $27,470,000 previously authorized for reconstruction and equipping FINSIDER's three plants. Total cost of the project is about $134 million, Italy contributing the balance.

MSA Turns to the Far East

A "streamlined" Mutual Security Agency will step up its economic and technical aid program in the Far East. MSA's Asian program will assist Burma, Indochina, Indonesia, Thailand, the Philippines and Formosa in the development of raw materials which are needed by the industrial countries of Europe and the U. S. The work in the Far East will also include activities in agriculture, forestry, fisheries.

Mobile Slitting Machine Aids in Warehouse Problems

LIKE MANY other firms, Lewis Welding & Engineering Co., Bedford, O., faced warehouse shortages in standard bar sizes and the necessity of cutting non-standard widths. To overcome this difficulty, Lewis engineers built a mobile eight-torch slitting machine that can cut seven pieces of uniform or combination widths in one operation.

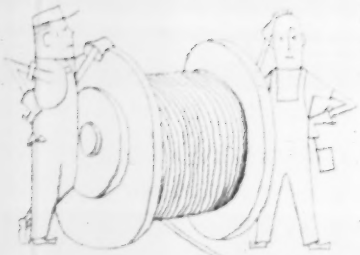
In one slicing the adjustable oxy-acetylene torches can handle any combination of widths of steel plates from ¼ inch to 6 inches thick and up to 10 feet wide and 20 feet long. A variable-speed motor drive propels the overhead torch unit at speeds appropriate to the thickness of the material being cut.

One advantage of the machine, which is operated by one man, is that by simultaneous cutting of parallel edges, the slitter eliminates most of the warping associated with long torch cuts. A newer model of the machine includes water quench nozzles which further reduce the warpage.

An auxiliary one-torch machine which operates on the same runway is designed to cut at right angles to the main unit. This eliminates extra handling of the plates.

LEWIS' EIGHT-TORCH STEEL BAR SLICER

. . . torches cut up to seven pieces of variable sizes in one pass



Surge of POWER in 1952

Today's production worker has nearly twice as much electricity at his command as in 1939. He'll get even more by 1954 when generating capacity may reach 105 million kw

YOU WILL have more silent partners to aid your production workers in 1952.

The power expansion program should make available to the average production employee in manufacturing this year 16,420 kilowatt hours of electricity, 33 per cent more than in 1948, 91 per cent more than in 1939 (see the table).

The Reason Why—More power per worker will be possible in 1952 because of an alltime record expansion program among utilities. The installed capacity now is 78 million kilowatts. By the end of 1952 it will be 88 million kw, 99 million kw by the end of 1953 and 105 million kw by the end of 1954. At the close of this year the utilities will have boosted their potential 35 per cent above what it was at the start of the Korean War. By the end of 1954, electric utilities hope to have boosted capacity by 40 million kw, or 62 per cent since Korea fighting began. The nation's power capacity in 1939 was only 38.9 million kw.

Now about half finished is a 4½-year expansion undertaken since mid-1950. Although the Korean war spurred construction, utilities have had an ambitious program underway ever since the end of World War II. Private utilities spent $10 billion on expansion from 1946 through 1951, will spend $7 billion more in the next three years. Of the 9.7-million kw expansion in 1952, 6.3 million will be for private utilities. Of the 10.6 million kw planned for 1953, 8.2 million will be private. Of 5.8 million for 1954, 4.8 million will be private. About 80 per cent of today's capacity is owned by private utilities; the planned construction will leave that proportion just about the same.

Slippage — Utility statisticians only one month ago put the expected capacity at 108 million kw by the end of 1954, but that estimate is down to 105 million kw now, largely because of materials scarcities. The producers of generating equipment have their order books bulging for the next two years. No significant additions to the capacity to produce generating equipment are in the offing, so power companies have had to lower their sights a little.

Power-Packed in '52

Kilowatt Hours per Production Worker in Manufacturing

	Avg. No. Workers	Electric Power (millions of kwhr)	Kwhr Per Worker
1939	8,192,000	70,518	8,608
1944	14,126,000	144,319	10,217
1948	12,717,000	154,000	12,252
1949	11,597,000	150,000	12,934
1950	12,350,000	178,000	14,410
1951	13,210,000	204,000	15,440
1952	13,400,000	220,000	16,420

Source: 1939-1949 National Industrial Conference Board. Others estimated by STEEL

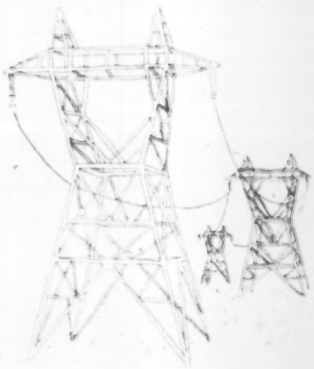
The worst bottleneck now is in transformers, largely because of the quantities of copper required in the equipment. Power switchgear equipment has also been a problem, but NPA promises to relieve that situation. Next quarter it will increase the amounts of controlled materials to be allotted switchgear fabrication.

Aluminum for Copper—NPA is pushing hard to have generating equipment makers switch more from copper to aluminum. For the first quarter of 1953, it hopes to allot for all products within its Electrical Equipment Division an additional 5 million pounds of aluminum above current requirements.

Because of the materials situation, many utility people consider as academic the report on the power program issued by NPA's Electric Power Advisory Committee early this month. That group found that the projects planned for the next three years "may be too small." Some—but not all—utility experts agree with the findings, but little can be done until metals become easier to find or more progress is made on alternating aluminum for copper.

A Matter of Geography—In analyzing where the geographical shortages in power will be the worst, the committee found greater industry agreement. The committee believes that the power supplies will be tight for the next three years in the area between the Great Lakes and the Gulf because so much defense work will gravitate to that area. In the Northeast and in the extreme West, with the exception of the Northwest, the prospect is for an increased surplus of power.

A future—but not immediate—answer to power shortages may be atomic-generated power. Last Dec. 21 more than 100 kw was



Materials shortages are slowing down the power expansion program a little, but even so the gains in electrical generating capacity will be the largest yet over the next three years

generated by atomic energy and used to operate pumps, reactor equipment and other electrical facilities at the National Reactor Testing Station, Arco, Idaho. Cost was no object in that test, but it will be the chief limiting factor in the generation of commercial power from atomic energy for some years to come.

Still Good—Despite some cutbacks necessitated in the power expansion program, public and private utilities this year may produce a record 400 billion kwhr—more than triple 1939 output. Some 55 per cent of power production each year is used for manufacturing. The proportion going to industry, which has stayed about the same for the past decade, is expected to rise in coming years because of expansions by big power-consumers such as the aluminum and electrochemical industries.

You may have occasional power shortages over the coming year, but except in a few areas they will not be severe. Even so, each of your production employees will use at the flick of a switch nearly twice as much electricity in 1952 as in 1939.

Electric Utilities Rationed

The Defense Electric Power Administration issued controlled materials quotas to electric utilities for maintenance repair and operating purposes in the second quarter as well as advance quotas of materials for the latter half of 1952 and the first quarter of 1953.

Copper rations to the industry will be cut while aluminum quotas will be boosted to spur its substitution for copper.

Expansion Program Nears Half-way Mark

If the schedule is maintained, the major portion should be done by end of 1953, but further cutbacks in controlled materials may change earlier DPA estimates

ABOUT 46 PER CENT of the facilities expansion program for defense production, representing over $4.5 billion out of a total contemplated cost of $9.9 billion, was in place as of Dec. 31, 1951, Defense Production Administration estimates from incomplete figures. At the end of the third quarter on Sept. 30, 1951, only 35 per cent was completed.

Machinery Monopolizes—Of the total cost 66 per cent is for machinery and equipment, 31 per cent goes for construction, and the remaining 3 per cent is for overhead and land.

If the expansion goes on schedule, DPA says that more than 95 per cent will be completed and in operation by the end of 1953, with the rest being finished in 1954.

Materials Manacle — Material shortages in the third quarter threw the program a little behind schedule, DPA says. Further cutbacks in allotments of controlled materials may reduce the fourth quarter estimates.

The table below shows figures for the leading 22 industries which account for 83 per cent of the total reported cost. The railroad (line-haul operating) program, which consists mostly of equipment delivery, is nearest to completion at 67 per cent on Sept. 30 and an estimated 83 per cent on Dec. 31.

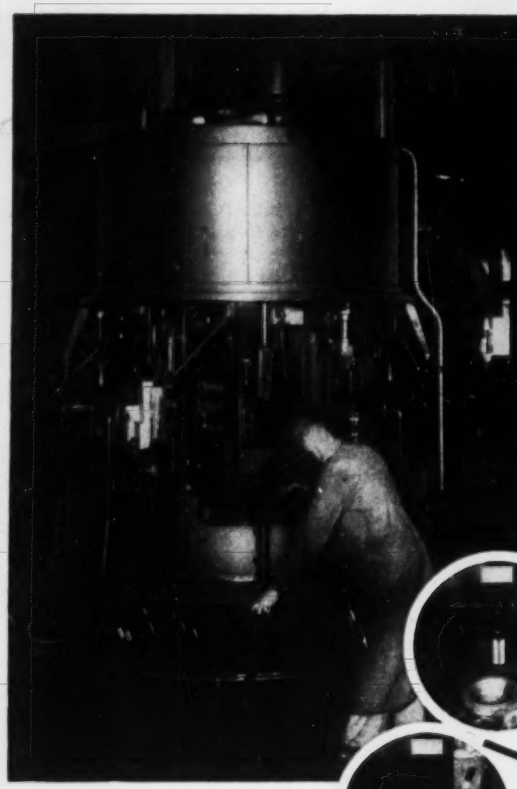
The steel industry has the largest single program representing nearly $2.4 billion worth of expansion. Works and rolling mills were 31 per cent complete on Sept. 30, but furnaces were only 12 per cent finished.

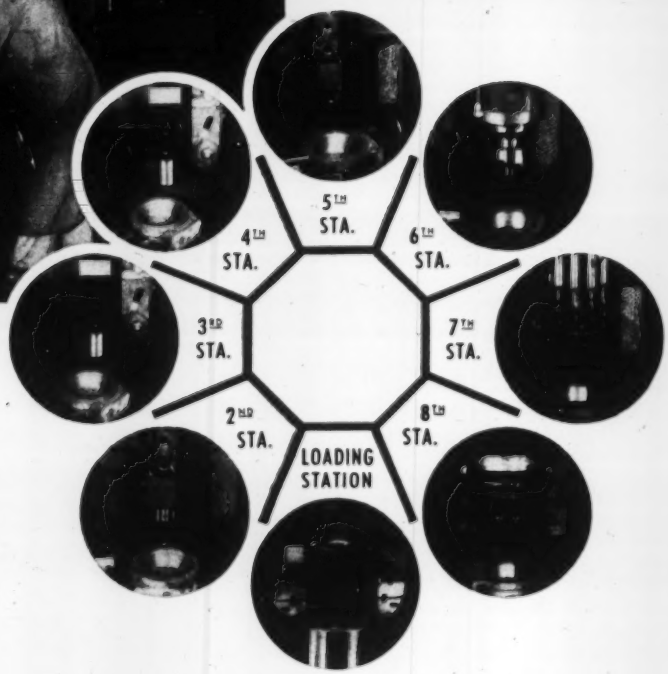
On Dec. 31, certificates of necessity had been issued to 5443 new or expanded facilities. Total value of projects was about $11.5 billion.

Industry	Total Reported Cost Thousands of Dollars	Reported Value in Place June 30, 1951 Thousands of Dollars	%	Sept. 30, 1951 Thousands of Dollars	%	Est. Value in Place Dec. 31, 1951 Thousands of Dollars	%
GRAND TOTAL	$9,850,386	$2,398,162	24	$3,491,711	35	$4,573,461	46
Pulp Mills	306,677	53,923	18	89,382	29	111,366	36
Paper & Board Mills	157,639	21,288	13	33,240	21	48,162	31
Alkalies & Chlorine	227,477	37,624	17	59,232	26	82,916	36
Ind. Inorg. Chem.	373,468	39,424	11	67,197	18	86,369	23
Synthetic Fibers	123,588	5,953	5	13,567	11	22,878	19
Ind. Org. Chem.	182,962	49,972	27	75,369	41	109,941	60
Comp. & Liq. Gases	71,261	14,911	21	20,532	29	31,118	44
Petroleum Refining	630,914	138,567	22	201,343	32	241,574	38
By-Products Coke Oven	93,113	17,350	19	23,776	26	32,222	35
Hydraulic Cement	58,288	13,614	23	19,944	34	30,835	53
Blast Furnaces	339,204	20,504	6	39,619	12	63,010	19
Steel Works & Rolling Mills	2,058,966	469,575	23	636,963	31	838,065	41
Primary Refining-Aluminum	586,444	65,334	11	95,585	16	160,678	27
Welded & Heavy Riveted Pipe	184,976	28,121	15	38,199	21	50,976	28
Mach., except Elect.	229,741	47,638	21	83,900	36	120,605	52
Electrical Machinery	160,208	33,336	21	60,968	38	80,809	50
Aircraft	53,954	9,193	17	26,154	48	36,196	67
Aircraft Engines, Parts	339,496	59,618	18	98,509	29	136,611	40
Aircraft Parts & Auxiliary Equipment	74,733	19,908	27	25,555	34	32,381	43
Railroad, Line-Haul Op.	1,136,356	583,548	51	765,917	67	941,527	83
Great Lakes Transport.	112,441	23,666	21	31,992	28	45,157	40
Electric Light & Power	652,386	200,893	31	267,440	41	326,687	50
All Other	1,696,094	444,212	26	717,308	42	945,478	56

Progress Toward Completion of Facilities Covered by Certificates of Necessity Issued Through September 30, 1951, Including Construction, Machinery and Equipment

A KEY UNIT TO LOWER COSTS





1st Station—:
Loading

2nd Station—:
Rough Bore—Three Diameters

3rd Station—:
Rough Face—Three Surfaces

4th Station—:
Finish Face—Three Surfaces

5th Station—:
Finish Bore—Three Diameters and Chamfer

6th Station—:
Precision Bore—Two Diameters

7th Station—:
Multiple Drill—Ten Holes

8th Station—:
Multiple Tap—Ten Holes

Many of today's economic problems are being solved through lower manufacturing costs. A Mult-Au-Matic installation may be the solution to some of YOUR PROBLEMS.

Let Bullard engineers study your manufacturing methods with a view towards reducing your manufacturing cost via the Mult-Au-Matic Method. Write for Mult-Au-Matic "Pictorial".

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

The race for more horsepower goes unchecked. Cadillac's 1952 model develops 190 hp, surpassing Chrysler which boasts 180, to win the title of "Broker's Hot-Rod"

DETROIT

THERE IS a fair sized body of opinion which holds that some automakers have gone too far in loading their cars with power.

One of the most interesting speculations to be heard in the auto capital is: "What would happen if a new car were announced and ballyhooed as having 25 per cent less horsepower?" It appears extremely improbable that this ever will happen, although no one has any idea where the horsepower race is leading.

The Customer: Always Right— The basic reason the trend is toward higher horsepower is that almost all the things motorists demand can best be achieved that way. They want good over-all performance which embodies such things as acceleration and reserve power to get out of tight spots, and economy. Few want the top speeds that such horsepower enables them to attain, but nearly all take some pride in relating that their odometer goes up to 120. On the economy side, it is frequently disconcerting to two-car owners to discover that the lower-powered car may not obtain anything like the miles-per-gallon which the large car gets. There are exceptions both ways, of course.

As expected, the industry's top horsepower rating for last year—Chrysler's 180—has now been surpassed. Considerable pleasure was displayed by Cadillac's top brass when they heard the "Ohs and Ahs" go up from a group of suppliers when the announcement was made that the 1952 Cadillac develops 190 horsepower.

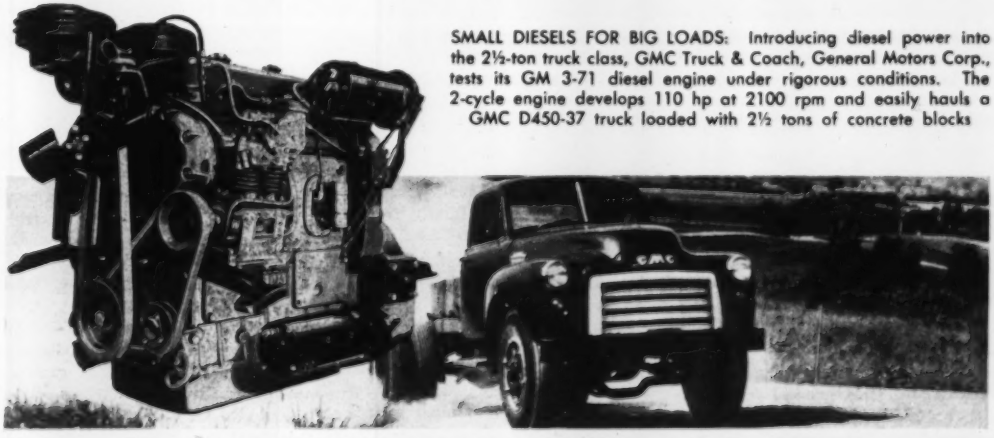
Reserve Power—Chrysler, meanwhile, is letting it be known that with relatively few changes its firepower engine develops 310 horsepower. Inference is that if outdoing the competition horsepowerwise is necessary, Chrysler has the wherewithal.

Some of the changes Chrysler could make are those which Cadillac has made. Both have a fundamental precept: The more fuel and air which can be taken into a cylinder of given size the more push will be exerted against the piston when that mixture is detonated.

The How of It—In Chrysler's case this can be accomplished by: 1. Enlarging the valves and ports; 2. substituting a two-runner intake manifold, each branch equipped with two carburetors, for the present manifold and dual carburetor; 3. modifying the valve timing so intake and exhaust valves are open for a longer period; 4. sweeping back the exhaust manifold so that suction created in the tube helps exhaust succeeding cylinders; 5. increasing compression in the chamber (nominally) from 7.5 to 1 to 8.1 to 1. This last is accomplished by extending the piston into the chamber slightly and enlarging the valves.

Cadillac uses some of the same methods and adds its own embellishments to get its horsepower boost. Whereas Chrysler would put four carburetors on the engine, Cadillac uses a four-barreled unit. This is basically the same change as has been made in the Buick Roadmaster and in the Oldsmobile "98" this year.

Redesign—Cadillac furthermore has completely redesigned its induction and exhaust system, enlarging intake and exhaust manifodls and exhaust valves and ports. It approaches the problem of exhaust back-pressure and interference by equipping the engine with two separate exhausts and mufflers—one for each cylinder bank. These two pipes are brought to the rear of the car and vent through ports at the outer ends of the rear



SMALL DIESELS FOR BIG LOADS: Introducing diesel power into the 2½-ton truck class, GMC Truck & Coach, General Motors Corp., tests its GM 3-71 diesel engine under rigorous conditions. The 2-cycle engine develops 110 hp at 2100 rpm and easily hauls a GMC D450-37 truck loaded with 2½ tons of concrete blocks

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bumper. This innovation may prove almost as much a styling feature as Cadillac's rear fender fins, and along with the higher horsepower has won for the 1952 model the informal title: "Brokers' Hot-rod."

Other features of note in the Cadillac include adoption of the dual-range Hydra-Matic and choice of two axle ratios. With the power boosted about 20 per cent, the brake drums have been ribbed for greater strength and better cooling, front wheel drums are of larger diameter, and thickness of brake lining has been increased by 50 per cent. GM's version of hydraulically assisted power steering is available as optional equipment.

Big Car Year for GM

This is General Motors' year for concentrating on its big cars. Buick's Roadmaster pointed the way by having the lion's share of that division's innovations. And Oldsmobile adheres to the pattern by making its series "98" its major talking point.

Longer over-all by five inches than last year's 208 inches and with two inches more on the wheelbase, the new Olds "98" takes on an entirely new appearance. Four of the added inches in over-all length goes into the luggage compartment. Rear fenders have been redesigned to accentuate the length and the distinctive diagonal "sash" of last year's Super "88" becomes a "98" styling feature.

Oldsmobile's lowest priced series, the Deluxe "88", is now on the Super "88" 120-in. wheelbase and has its 204-inch over-all length. Its 145-horsepower engine is upped 10 points over last year.

Both "98" and Super "88" series this year have a horsepower rating of 160, up 25 from last year's power plant. Chiefly responsible for the increase is the aforementioned four-barrel carburetor. To handle the higher power meant beefing up the pistons and adding heavier counterweights to the crankshaft. The valve lift was also increased to admit and expel greater volume of air.

Economy of the two engines, according to Olds general manager, J. F. Wolfram, is improved by about 5 per cent. Part of this results from the new Hydra-Matic and a lower axle ratio. Power steering a la Buick and Cadillac is optional at extra cost on all but the Deluxe "88."

Production in the "98" series so far has been limited to the four-door sedan, but hardtop coupe and convertible will become available in April, and Oldsmobile intends to step its percentage of "98s" to about 35 per cent of total output, with the goal of putting out about as many of this series as it did last year, despite lower over-all production.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,882
February	658,918	505,595
March	802,737	610,678
April	680,281	585,707
May	695,898	732,164
June	653,682	897,852
Six Mos.	4,137,204	3,941,878
July	522,858	746,801
August	571,442	842,335
September	505,758	760,848
October	548,350*	796,012
November	480,323*	633,876
December	391,272*	671,621
Week Ended	1951	1950
Dec. 29	39,488	135,229
	1952	1951
Jan. 5	53,601	100,072
Jan. 12	92,741	139,787
Jan. 19	99,697	161,867
Jan. 26	101,000*	167,869

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Mercury: Radically Different

The radically different Mercury will make its appearance in dealer showrooms Jan. 30. Viewed from various angles this car has vaguely familiar lines to prove again that there is nothing new under the sun. But over-all it introduces a completely fresh approach to clean styling, and one which will be picked up by all Ford cars this year. A very close family resemblance, in fact, will be discernible.

Its front-end treatment is unique, since the car has nothing which can be called a grille. A double bumper bar with "teeth" extending downward has taken the place of the conventional bumper and is mounted high so as to eliminate the need for bumper guards.

Also distinctive is a dummy "airscoop" with an integral hood ornament on the low hood. Airscoop motif is picked up by the slanting chrome stone shields which delineate the rear fenders.

By sharply slanting the front windshield pillars, and incorporating a deeply curved front windshield, visibility to the front is exceptional. The rear window, given hardtop styling treatment in all models, provides unusual rearward visibility.

A more complete line than has ever before been offered by Mercury will be featured. Designated Mercury and Mercury "Monterey" eight body styles will appear, with sports cars predominating. In the four door sedans, rear doors are now hinged from the front.

Included in the car's innovations are "pendular" type brake and clutch pedals, suspended from above. The master brake cylinder is mounted behind the dash panel. The gas tank filler tube is hidden behind the license plate which flips down to give access.

The instrument cluster is unique, consisting of a horizontal section extending from the dash outward almost to the steering wheel. On it is mounted at an angle a semi-circular housing for the odometer and the usual gages. And on the flat top of the panel are several controls which resemble in appearance airplane throttles. These operate the heater, etc.

Refinements have been made in the engine, a major one being the upping of compression ratio from 6.5 to 1 to 7.2 to 1 to give a 13 point increase in horsepower rating to 125.

Small, Light Diesel Ready

Described by its developers, GMC Truck & Coach Division of General Motors, as the smallest and lightest diesel ever to be commercialized for highway use, a new "welterweight" diesel truck in the 2½ ton class has been introduced. Incorporating a three-cylinder 110-horsepower engine, built by GM's Detroit Diesel Division, the truck is officially designated the D450-37 and is available in five wheelbases.

According to GMC's general manager, Roger M. Kyes, this opens a market in which there is no diesel competition.

the symbol of quality . . .

in

ELECTRIC FURNACE STEELS

STANDARD STRUCTURAL ALLOY

BEARING QUALITY

ALLOY TOOL

SPECIALTY

NITRALLOY

CARBON TOOL

MAGNAFLUX-AIRCRAFT QUALITY

Hot Rolled • Forged • Annealed • Heat Treated
Normalized • Straightened • Cold Drawn
Machine Turned • Centerless Ground

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New York, New York

176 W. Adams Street
Chicago, Illinois

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Tulsa, Oklahoma

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Cleveland, Ohio

7251 General Motors Bldg.
Detroit, Michigan

325 W. 17th Street
Los Angeles 15, Calif.

1140 Lockwood Drive
Houston 20, Texas

528 Fisher Building
Detroit, Michigan

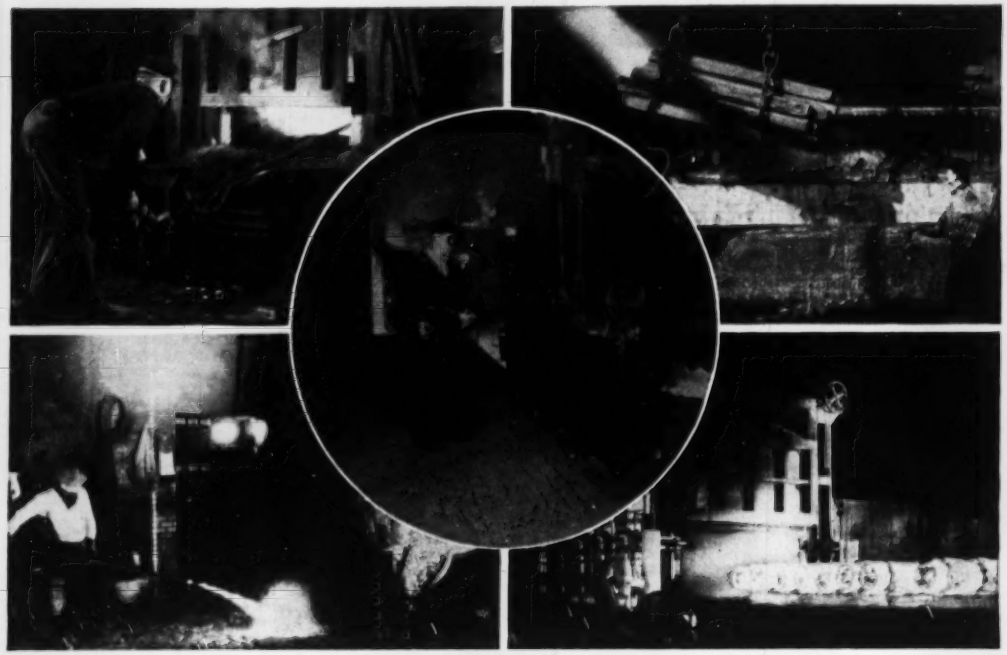
3104 Smith Tower
Seattle, Washington

Monadnock Building
San Francisco 5, Calif.

803 Loew Building
Syracuse, New York

SELL YOUR SCRAP

One out of five is a full time inspector



Another reason why you're sure of UNIFORMITY with TIMKEN® forging steels

ONE out of every five employees in the Timken® steel plant devotes his full time to quality control. One example is the man in the center photo above who is checking molten steel with an optical pyrometer.

Checking for surface defects is only one way the Timken Company insures uniform quality in forging steels. In fact, every heat of Timken forging steel goes through 70 separate checks for chemical composition before it's tapped!

Controls like these insure uniform physical and chemical properties, uniform forgeability and uniform response to heat treatment in the Timken forging steels you buy. As a result, your forgings have higher, more uniform quality. You have fewer rejects, fewer delays and fewer changes in shop practice.

For help with your forging problems, consult our Technical Staff. Write us today for our "Technical Bulletin No. 31" which will give you the Chemical composition of alloy steels. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

The Business Trend

Industrial activity index drifts sidewise on plane lower than year ago but may recover with pickup in civilian and nondurable goods production

EVEN TENOR of business distinguished January. Total activity drifted lower in the past six weeks though, and comparisons with year-ago indicators aren't impressive.

Scattered signs of a pickup in civilian segments of the economy are becoming evident. Retail trade, after a poor start this year, is making a better showing against abnormal marks of early 1951. Production of nondurable goods, on the downgrade since August, appears to be reversing its trend. Weapons deliveries are being speeded.

High Spots — Confirmation of the December production lull came from the President's Council of Economic Advisors—which, incidentally, is under attack by Congress. The council reported no change in the Federal Reserve Board's industrial production index, though durable goods output rose for the fifth successive month. The durables index is still under the high mark registered last spring when civilian production was unrestricted.

Gross national product rose by about $5.5 billion to an annual rate of $333.0 billion in the fourth quarter, the council estimated. National income moved up $4 billion to a new high of $282 billion, but consumer spending remained low relative to income. The government's budgetary cash surplus of $6.7 billion in 1951's first half (seasonally adjusted annual rate) was replaced by a $5.1 billion deficit in the second half.

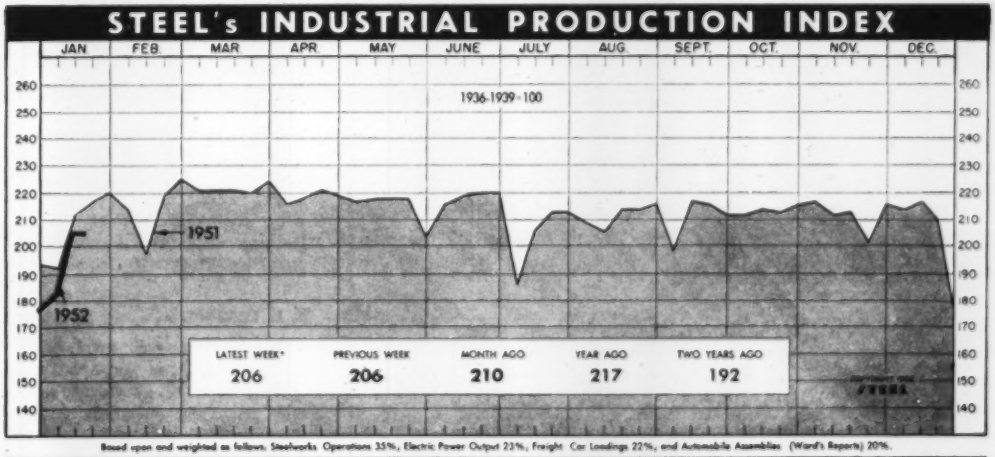
Index Steady—Revisions in the steelworks operating rate (see below) caused downward adjustment in STEEL's industrial production index for the first three weeks of 1952. In the week ended Jan. 19, the index was pegged at 206 (1936-1939=100). That's the same reading as the week before but 22 points above the first week of the year. In the latest indexed week, higher auto output made up for lowered steel mill operations.

Nearing the Goal. . .

Boasting a 33 per cent increase in productive capacity since 1940, U. S. steel mills started 1952 with an annual rated capacity of 108,587,670 net tons, says American Iron & Steel Institute. That's a 4.3-million-ton addition in 1951; a considerably larger increase than 1951's is scheduled to be made this year. Annual capacity is now only 9.5 per cent below the 120-million-ton goal expected to be reached in 1953. Adjustment of the national ingot rate to conform with the new weekly production capacity (2,077,040 tons) resulted in lowering of steelworks operations below rated capacity for the first four weeks of the year. Tonnagewise, though, each week so far has passed the 2-million-ton mark. In the week ended Jan. 26, mills were expected to turn out 2,065,000 tons of ingots and castings steel, 14,000 tons more than were produced in the preceding week. Shipments are headed for new highs too: More finished steel was shipped in 1951's first 11 months (72,491,400 net tons) than in any other full year.

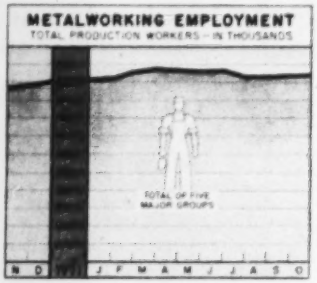
Shifting Gears. . .

On the basis of performance so far this year, automakers won't miss their first-quarter production ceiling by much. The deficit, if any, will be attributable to snags in assemblies by some of the Independents. When all producers get new model assembly wrinkles ironed out, total auto-truck output in U. S. and Canadian plants will hover steadily about the 110,000-unit mark. In the week ended



Based upon and weighted as follows: Steelworks Operations 35%, Electric Power Output 23%, Freight Car Loadings 22%, and Automobile Assemblies (Ward's Reports) 20%.

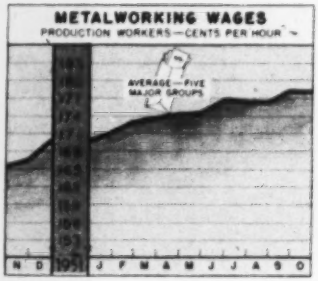
* Week ended Jan. 19



Metalworking Employment
Production Workers—Five Major Groups

1950	Prim. Mtls.	Fab. Prod.	Mach. inery	Elec. Mchy.	Trans. Equip.
Oct.	1,117	850	1,104	710	1,157
Nov.	1,126	850	1,133	721	1,139
Dec.	1,142	852	1,163	724	1,160
1951					
Jan.	1,149	847	1,192	711	1,175
Feb.	1,153	852	1,215	716	1,233
Mar.	1,159	858	1,231	724	1,253
Apr.	1,161	859	1,239	718	1,243
May	1,162	860	1,242	707	1,233
June	1,172	843	1,252	704	1,237
July	1,155	813	1,235	684	1,187
Aug.	1,165	816	1,211	695	1,197
Sept.	1,159	811	1,219	709	1,210
Oct.	1,154	808	1,243	718	1,193

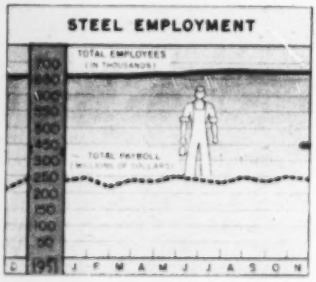
U. S. Bureau of Labor Statistics



Metalworking Hourly Wages
(cents)
Production Workers—Five Major Groups

1950	Prim. Mtls.	Fab. Prod.	Mach. inery	Elec. Mchy.	Trans. Equip.
Oct.	166.6	157.6	165.5	152.3	178.1
Nov.	167.8	158.0	167.5	153.9	179.0
Dec.	175.8	161.0	169.8	155.5	181.6
1951					
Jan.	178.9	162.2	171.6	155.6	180.6
Feb.	177.9	163.5	172.6	156.9	181.5
Mar.	179.7	165.2	174.5	158.2	183.8
Apr.	175.8	165.5	174.9	158.8	182.9
May	179.9	165.5	175.0	160.4	183.3
June	181.9	166.1	176.2	161.8	186.0
July	181.9	165.8	175.4	163.7	186.3
Aug.	180.6	165.5	176.4	162.8	187.1
Sept.	183.4	167.3	178.5	164.3	188.4
Oct.	180.9	168.1	179.6	165.6	188.5

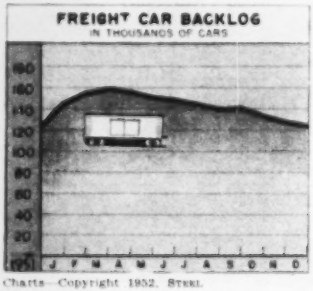
U. S. Bureau of Labor Statistics



Steel Employment, Payrolls

	Employees† in Thousands		Payrolls in Millions	
	1951	1950	1951	1950
Jan.	657	609	$245.3	$189.3
Feb.	663	613	219.4	174.7
Mar.	663	616	238.3	190.0
Apr.	666	621	234.8	186.2
May	667	628	249.0	199.9
June	674	636	240.7	195.3
July	678	643	231.9	188.7
Aug.	679	649	247.7	206.6
Sept.	677	650	236.3	203.8
Oct.	674	650	249.9	212.2
Nov.	675	653	242.0	208.0
Dec.		657		203.0

† Monthly average American Iron & Steel Institute



Freight Car Awards and Backlogs

	Awards		Backlogs*	
	1951	1950	1951	1950
Jan.	26,356	9,376	144,758	19,026
Feb.	13,947	9,065	154,861	26,055
Mar.	11,271	6,201	158,619	30,539
Apr.	6,628	3,298	155,871	32,857
May	4,919	11,636	150,628	42,300
June	6,793	2,095	147,725	40,585
July	2,417	30,065	144,510	67,084
Aug.	1,828	23,850	139,014	86,156
Sept.	9,657	25,111	140,135	106,611
Oct.	3,464	21,886	132,792	122,148
Nov.	6,752	10,573	129,158	126,870
Dec.	3,309	3,326	123,947	124,489
Total	96,190	156,482		

* End of month

American Railway Car Institute

Charts—Copyright 1952, STEEL.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction	Dec. 10	Ironers	Jan. 21	Ranges, Elec.	Dec. 24
Durable Goods	Oct. 8	Machine Tools	Jan. 14	Refrigerators	Dec. 24
Fab. Struc. Steel	Nov. 12	Malleable Castings	Dec. 31	Steel Castings	Dec. 31
Foundry Equip.	Jan. 21	Prices	Jan. 14	Steel Forgings	Dec. 31
Furnaces, Indus.	Jan. 21	Pumps	Dec. 10	Steel Shipments	Dec. 17
Gear Sales	Dec. 17	Purchasing Power	Oct. 8	Vacuum Cleaners	Dec. 3
Gray Iron Castings	Dec. 31	Radio, TV	Jan. 21	Washers	Jan. 14
Indus. Production	Jan. 14	Ranges, Gas	Dec. 24	Water Heaters	Dec. 24

Jan. 19, *Ward's Automotive Reports* calculates total completions at 99,697, up almost 7000 units from the week before. U. S. truck makers are currently erecting vehicles at a 1.2 million annual rate.

Gas Equipment Forecast. . .

Sales increases are not forecast for 1952 by manufacturers of gas appliances and equipment. That's the consensus of manufacturers surveyed by Gas Appliance Manufacturers Association. GAMA's weighted compilation shows sales of domestic gas ranges will be down 24 per cent in 1952. Shipments in 1951 approximated 2,350,000 units, compared with the 1950 peak of 3,023,200. Manufacturers of automatic gas water heaters look for a 19 per cent drop this year. Makers of gas-fired central heating equipment (furnaces, boilers, conversion burners) see a 3 per cent gain. Clothes dryer volume will be about the same this year, but unit heater business will be 22 per cent lower.

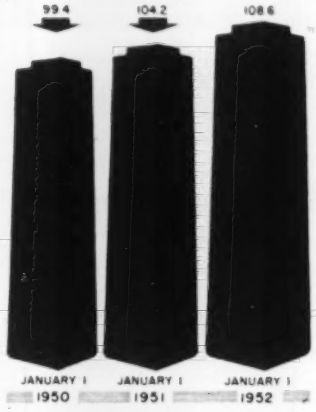
GAMA's survey showed very few companies expect to decrease advertising and promotional activities this year—an indication that few manufacturers see return of a sellers' market for their products. In asking who has or expects to get defense contracts, GAMA found larger companies with more diversified production facilities absorbing the defense work. Some 19 per cent of total productive facilities of reporting manufacturers was already devoted to defense production. About 30 per cent of all productive facilities of those companies reporting will be converted, according to the survey. In trying to establish "break-even" points for the various manufacturers, GAMA found that slightly over 80 per cent of 1951 civilian production (excluding defense work) would be needed to keep most companies out of the red. Ratios varied from 67 to 92 per cent of 1951 activity.

In a Vacuum. . .

Another consumer goods industry that can look for little relief from low metals allotments is the one producing vacuum cleaners. Last year its production skidded down 22.7 per cent from the 1950

Steelmaking Capacity Swells

(Annual Rate, U. S.)



Source: American Iron & Steel Institute

total. December sales of 230,263 units were higher than November's, making the year's tabulation 2,729,104 units, Vacuum Cleaner Manufacturers' Association reports. Total sales in 1950 were 3,529,412 units.

Back to the Wall. . .

Coal producers, looking toward March wage talks with little relish, find rising costs and declining prices already forcing them to the wall. Costs are up, says Appalachian Coals Inc., a marketing agency, because of wage increases and boosted freight rates. (Prices are down because coal is somewhat of a glut on the market.)

Bituminous stocks above ground have risen steadily since mid-1948 when coal demand and supply came into balance; in December they totaled nearly 78 million tons —enough to last 58 days at winter consumption rates. One answer to the high-stock problem may lie in increased exports: Overseas markets are expected to take more than 8 million tons of bituminous during January and February, says the Office of International Trade. Current mining of bituminous continues strong.

Trends Fore and Aft. . .

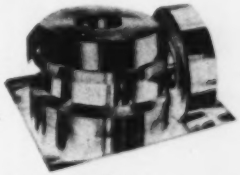
Total indebtedness of foreign countries to the U. S. is $10 billion; collections this year are expected to exceed half a billion dollars. . . Wholesale prices in the week ended Jan. 15 were 1.9 per cent below the level of a year ago. . . The trucking industry handled 137 billion ton-miles of freight and spent $3.3 billion for new equipment during 1951, adding nearly half a million new vehicles. . . Tax revenues of the Canadian government have exceeded spending in each of the last five fiscal years.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	98.0	97.5	99.5
Electric Power Distributed (million kwhr)	7,540	7,666	6,909
Bituminous Coal Output (daily av.—1000 tons)	1,961	1,521	1,970
Petroleum Production (daily av.—1000 bbl)	6,200[1]	6,178	6,051
Construction Volume (ENR—millions)	$249.2	$280.7	$391.6
Automobile, Truck Output (Ward's—units)	99,697	92,741	161,867
TRADE			
Freight Car Loadings (unit—1000 cars)	750[1]	743	780
Business Failures (Dun & Bradstreet, number)	158	164	167
Currency in Circulation (millions)[3]	$28.5	$28.8	$27.2
Dept. Store Sales (changes from year ago)[3]	−13%	−21%	+31%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$16,633	$17,746	$16,938
Federal Gross Debt (billions)	$259.3	$259.1	$256.0
Bond Volume, NYSE (millions)	$15.7	$14.3	$30.9
Stocks Sales, NYSE (thousands of shares)	8,339	8,331	18,248
Loans and Investments (billions)[4]	$73.7	$74.2	$70.8
United States Gov't. Obligations Held (billions)[4]	$32.1	$32.2	$33.0
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	171.92[1]	171.92[1]	171.92
STEEL's Nonferrous Metal Price Index[6]	234.9	234.9	261.0
All Commodities[7]	176.5	177.2	179.9
Metals and Metal Products[7]	190.9	190.9	186.9

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,088,224. [3]Federal Reserve Board. [4]Member banks, Federal Reserve system. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1926=100.

LET'S TALK FLAT ROLLED STEEL PRODUCTS



Specializing in flat rolled metal products assures you a greater than usual interest for requirements in this range. Kenilworth's modern equipment and facilities are geared for almost instant service when order processing begins. So, when you have a need for spring steel (annealed or tempered), stainless sheets or coils, tin coated steel, shim steel and other flat rolled products, try Kenilworth first.

LET'S TALK ABOUT SUPPLY

Today's controlled and critical supply may be hurting you more than necessary. While our inventory varies, from day to day, it may be possible to assist you with your very need now. You can be certain you will get immediate and interested attention with an instant response of current availabilities.

LET'S TALK TO...

THE Kenilworth Steel co.

750 BOULEVARD
KENILWORTH, N. J.

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N. J. UNionville 3-4900
Teletype: Roselle, N. J., 387

LET'S TALK ABOUT ALL OF KENILWORTH'S SERVICE

Custom slitting and shearing service for your metals to handle sizes from .001" to .187" in widths up to 36" is available — precision equipment assures minimum camber, minimum burr and closer than standard tolerances when required.

Speed Nut Savings Stories

Beseler "Throws Light" ON 50% TIME SAVINGS

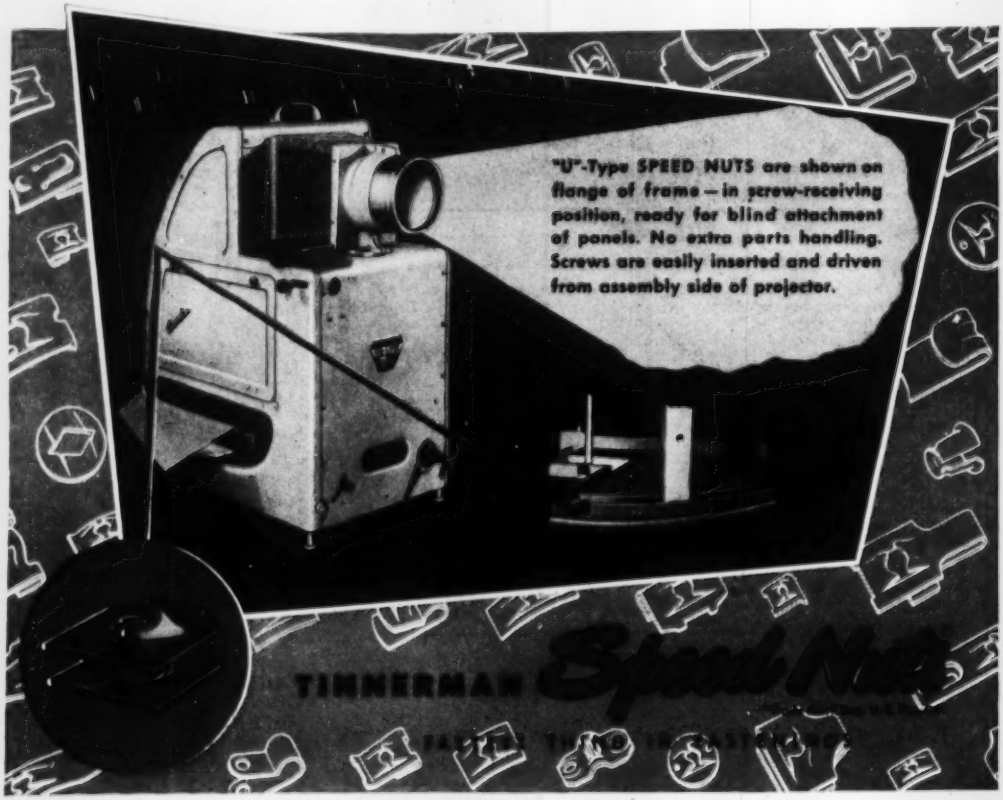
How the Charles Beseler Company, Newark, New Jersey, eliminated 84 fasteners and cut assembly time and cost in half on new opaque projector assembly

It used to take 168 screws, nuts and washers to attach the cover panels to the base frame of the new Beseler opaque projector. That was before "U"-Type SPEED NUTS were tried. Now it takes only 84 screws and SPEED NUTS to do this job.

By making this switch, Beseler picked up a 5% material savings, reduced handling, stocking and ordering of parts and made a substantial 50% saving in assembly time.

"U"-Type self-retaining SPEED NUTS are pre-assembled on the base frames of projectors — ready for simple attaching of panels as frames come down assembly line. Time required for this step was cut from 13 minutes to 6, and the production rate was increased to a new high.

There is no better time than now to take a close look at *your* fastening costs. Savings here often balance rising costs elsewhere. Your Tinnerman representative will supply helpful details. Call him in — and write now for your copy of Savings Stories, Vol. III. TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio. In Canada: Dominion Fasteners, Limited, Hamilton. In Great Britain, Simmonds Aerocessories, Limited, Treforest, Wales.


"U"-Type SPEED NUTS are shown on flange of frame — in screw-receiving position, ready for blind attachment of panels. No extra parts handling. Screws are easily inserted and driven from assembly side of projector.
TINNERMAN

Men of Industry

WILLIAM A. JAHN
. . . Inland Steel Products V. P.-sales

ROBERT I. HICKS
. . . heads Lamson Corp.

ARTHUR H. RICE
. . . V. P.-production at G. A. Gray Co.

William A. Jahn was elected to the new post of vice president in charge of sales by **Inland Steel Products Co.**, Milwaukee. **Robert S. Schmieder** remains as general sales manager, while **H. B. Brown** was appointed to another new post, general manager of distribution and merchandising.

Detroit Steel Products Co., Detroit, announces retirement of **H. F. Wardwell**, chairman of the board; **E. R. Ailes**, treasurer; **R. W. Weed**, vice president-eastern sales; **J. P. Donohue**, traffic manager; and **F. J. Williams** of the sales department. New officers elected to fill these positions are **C. G. Bunting**, formerly secretary and assistant treasurer, who becomes secretary-treasurer; **A. E. McKenzie** becomes eastern regional sales manager, and **Harold Gilecek**, was named traffic manager. Both Mr. Wardwell and Mr. Ailes continue as members of the board of directors. The office of chairman of the board remains vacant.

E. L. Ellis was appointed credit manager of **Drake Steel Supply Co.**, Los Angeles.

Frederick K. Pulsifer, manager of the Pacific Coast division of **Chase Brass & Copper Co.**, Waterbury, Conn., replaces **Charles L. Moseley** as Rochester, N. Y., district manager. Mr. Moseley was transferred to the general sales offices in Waterbury.

Niles Tool Works Co., division of Baldwin-Lima-Hamilton Corp., Hamilton, O., appointed **D. C. Weiss** sales representative in western Pennsylvania, eastern Ohio and West Virginia. Sales headquarters are in the corporation's Pittsburgh offices.

Lamson Corp., Syracuse, N. Y., elected **Robert I. Hicks** president and general manager to succeed **Carl F. Dietz**, who has held those positions since 1938, and who continues as president and general manager of the parent company, Lamson Corp. of Delaware and of its mail tube subsidiaries. **Francis D. Weeks** becomes chairman of the board and continues as vice president and treasurer. **Robert B. Coleman** was appointed sales manager. He joins Lamson after 15 years with American Chain & Cable Corp., where he was eastern regional manager of both the Wilson Instrument Division and Campbell Machine Division. Mr. Hicks, the new president, joined Lamson as general sales manager in 1939 and has been vice president since 1941.

Arthur W. Thornton was appointed assistant general superintendent, National Works, U. S. Steel's **National Tube Division**, McKeesport, Pa. He succeeds the late **W. L. Scott**.

Thomas J. Watson Jr. was elected president, **International Business Machines Corp.**, New York. He previously was executive vice president, and succeeds **John G. Phillips**, elected vice chairman of the board and chairman of the executive and finance committee. **Thomas J. Watson Sr.**, chairman of the board, continues as chief executive officer.

John A. Borman was appointed chief engineer, **Baker-Raulang Co.**, Cleveland.

H. G. Kraus joined **Gerlinger Carrier Co.**, Dallas, Oreg., as assistant national sales manager.

Arthur H. Rice joined **G. A. Gray Co.**, Cincinnati, as vice president in charge of production. He formerly was associated with Miehle Printing Press & Mfg. Co., Chicago.

Alexander S. Keller, formerly vice president and director, Pratt & Whitney Division, Niles-Bement-Pond Co., has joined **Lamb Electric Co.**, Kent, O., as a director and vice president in charge of finance.

Walter W. Moore, works manager, **Burnside Steel Foundry Co.**, Chicago, was elected a vice president.

Frank J. Nunlist Jr. was named general sales manager for **L. J. Mueller Furnace Co.**, Milwaukee. He succeeds **C. L. Hewitt**, resigned. Mr. Nunlist has been chief engineer.

Michael J. Kearins was elected president of **J. H. Williams & Co.**, Buffalo. He succeeds **A. D. Armitage**, elected to the new post of chairman of the board. Mr. Kearins is president of United Drill & Tool Corp., Chicago, which last year acquired control of the Buffalo company.

D. V. Sherlock, recently retired as vice president of **Blaw-Knox Co.**, Pittsburgh, and manager of its Union Steel Castings Division, was recalled to assume the position of acting manager of the Blaw-Knox Division at Blawnox, Pa. Mr. Sherlock succeeds **L. E. Joseph**, resigned.

C. D. King was appointed assistant vice president and chairman-engineering committees, **United States Steel Co.**, Pittsburgh. **J. Donald Rollins** be-

comes assistant vice president-engineering. Mr. Rollins has been serving as project manager, Fairless Works.

Louis Buchman was elected vice president and director of **Kennecott Copper Corp.**, New York. He has been associated with Kennecott interests since 1914. With headquarters in Salt Lake City, Utah, he continues supervision of all the company's western mining divisions.

Appointments to the executive staff of **Curtiss-Wright Corp.'s** new metals processing division in Buffalo include: **Theodore Tycocki** as works manager; **Frederic Townsend** as manager of orders, sales and contracts; **Everett Loppacker,** industrial relations manager; **William O. Fausak,** controller.

James G. Nicholson was promoted to general superintendent of the **New York Air Brake Co.** at Watertown, N. Y. **P. B. Fortune** was made director of budgets, methods and manufacturing controls.

Robert J. Sullivan was promoted to division manager, forging division, **Brewer-Titchener Corp.,** Cortland, N. Y. He had been assistant manager and purchasing agent since 1933.

Harold Brilmyer was appointed assistant to the president of **Huck Mfg. Co.,** Detroit.

D. W. Capstick was named St. Louis representative for **Pittsburgh Lectrodryer Corp.**

Aetna-Standard Engineering Co., Pittsburgh, appointed **A. H. Stromeier** sales engineer for its tubular division. He has served Aetna-Standard since 1936 as mechanical engineer and more recently as designer, proposal and project engineer.

A. H. STROMEIER
tubular div. sales, Aetna-Standard Eng.

C. E. CROMWELL
div. sales mgr., De Laval Steam Turbine

De Laval Steam Turbine Co., Trenton, N. J., appointed **C. E. Cromwell** sales manager, commercial division, and **J. H. Metzgar,** sales manager, standard products division.

Joseph V. Hutelmyer was appointed vice president in charge of engineering, **Cutler Metal Products Co.,** Camden, N. J. He also assumes duties as works manager for all plant operations. Mr. Hutelmyer joined Cutler in 1939 as chief engineer.

David S. Burnett joined **Detroit Steel Products Co.,** Detroit, as assistant sales manager, spring division.

Lewis-Shepard Products Inc., Watertown, Mass., appointed **David W. Niven** advertising manager.

Robert Picchietti was named purchasing agent of **Kling Bros. Engineering Works,** Chicago. He joined Kling a year ago, and formerly was with Danly Machine Specialties Inc.

Townsend Co., New Brighton, Pa., appointed **Edward T. Brown** to the

EDWARD T. BROWN
heads jobber sales at Townsend

J. H. METZGAR
div. sales mgr., De Laval Steam Turbine

newly created position of manager of jobber sales.

Love Bros. Inc., Aurora, Ill., elected **Robert F. Grover** president and general manager. He formerly was sales manager, vice president and general manager. Others elected are **B. C. Griswold,** vice president in charge of the machine shop; **R. R. Hendry,** vice president in charge of the foundry; and **Bernice Nashold,** secretary and assistant treasurer.

Ampco Metal Inc. appointed **Ben R. Hecker** field engineer in the Detroit office.

E. R. McCoy was appointed sales manager of **Joslyn Mfg. & Supply Co.,** Chicago, succeeding **M. W. Kenneally,** who will be sales consultant on a part-time basis.

John H. Nebel, Milwaukee district sales manager for **Gisholt Machine Co.,** Madison, Wis., retired after 51 years of continuous service. **Arthur E. Lynch** is his successor.

Frank Van Parys was appointed general plant manager, **Ammco Tools Inc.,** North Chicago, Ill.

George Williams was named quality control manager, manufacturing division, by **Pacific Airmotive Corp.,** Burbank, Calif., replacing **Felix H. Tevis,** promoted to administrative engineer.

Laurence E. Chamberlain, assistant manager, will replace **John J. Bohnen** as sales manager of **Inland Steel Co.'s** plate and shape division while the latter serves with NPA, Washington.

Douglas Aircraft Co. Inc., Santa Monica, Calif., appointed **J. R. McGowen** chief project engineer for the

TRANSUE FORGINGS

USUALLY COST LESS AT THE POINT OF ASSEMBLY

Forged Bull Gear used in Hay Balers. This alloy steel forging weighs 156 lbs.; is 23 inches in diameter, and is typical of T & W designing.

Consult our engineers when you are contemplating conversion to forgings or when you are in need of reliable forging service.

TRANSUE & WILLIAMS

STEEL FORGING CORPORATION • ALLIANCE, OHIO

SALES OFFICES: NEW YORK • PHILADELPHIA • CHICAGO • INDIANAPOLIS • DETROIT • CLEVELAND

OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE

W. J. KEARNEY
appointment at Korhumel Steel & Alum.

CLIFFORD E. ALLISON
Lewis Welding & Engineering treasurer

EVERETT M. HICKS
. . . Norton Co. V. P.-director

DC-6 and DC-7 series of transports. He replaces **J. B. Edwards,** resigned.

W. J. Kearney was appointed assistant to secretary in charge of tubular sales for **Korhumel Steel & Aluminum Co.,** successor to Korhumel-Heffron & Preiss Steel Co., Evanston, Ill. He was formerly Chicago district sales manager, Summerill Tubing Co.

Clayton Carl was appointed superintendent, West Point, Miss., works of **Babcock & Wilcox Co.**

Mary Karkocka was appointed assistant secretary, **Hydropress Inc.,** New York.

Austin Co., Cleveland, elected as vice presidents **C. W. Wolfe,** since 1938 assistant manager of its Cleveland district, and **Karl C. Sippel,** project manager of its work for Dow Chemical Co.

J. C. Foster succeeds **A. J. Fisher** as assistant chief engineer, **Bethlehem Steel Co.,** Bethlehem, Pa. Mr. Fisher was made general manager of the Johnstown, Pa., plant. **P. F. Dolan,** assistant general manager, Sparrows Point plant, retired after 53 years of service in the steel industry. He is succeeded by **L. F. Coffin.**

Clifford E. Allison was named treasurer of **Lewis Welding & Engineering Co.,** Bedford, O., to succeed the late **Frank G. Oviatt.**

George J. Muntean was appointed assistant superintendent of **Timken Roller Bearing Co.'s** Canton, O., bearing factory.

F. S. Elfred was elected executive vice president, and **B. E. Bassett,** vice president for production, **Olin Industries Inc.,** New York.

Roy B. Siegrist was appointed assistant general superintendent, **Sawhill Mfg. Co.,** Sharon, Pa. He formerly was chief industrial engineer at National Supply Co., Ambridge, Pa., and was recently with Kerotest Mfg. Co.

Pacific Airmotive Corp., Burbank, Calif., promoted **Boyd Dahle** from chief design engineer to chief engineer, manufacturing division.

A. M. Urquhart, formerly head of tooling, Douglas Aircraft Co., El Segundo, Calif., division, has joined **Sierre Machinery Co.,** Reno, Nev.

John F. Watkins was appointed assistant secretary of **Earle M. Jorgensen Co.,** Los Angeles.

Everett M. Hicks was elected vice president and a director of **Norton Co.,** Worcester, Mass. He remains manager of the company's grinding machine division. **Frank W. Smith,** who retired in December from active participation in management of the grinding machine division, has also retired from the board. He remains a vice president and is retained as consultant on Norton's new machine tool construction project. Mr. Hicks becomes a member of the executive committee.

Ipsen Industries Inc., Rockford, Ill., appointed **George K. Lane** district representative of its Cleveland and Pittsburgh territories. He will be located at 15017 Detroit Ave., Lakewood, O.

Stuart Steel Protection Corp. was formed by **Linden Stuart** as chairman of the board and **Linden Stuart Jr.** as president. Offices and warehouse are located at 2 Mark Rd., Kenilworth, N. J.

Robert E. Carr was appointed field representative of **Laminated Shim Co.,** Glenbrook, Conn., and will contact industrial plants and distributors in metropolitan New York, New Jersey, Pennsylvania, Maryland, Delaware and Washington, D. C.

OBITUARIES...

John H. Bunte, 65, purchasing director of **Howard Foundry Co.,** Chicago, died Jan. 17.

John M. Floyd, 56, executive vice president and a director of **A. O. Smith Corp.,** Milwaukee, died Jan. 19 of a coronary attack.

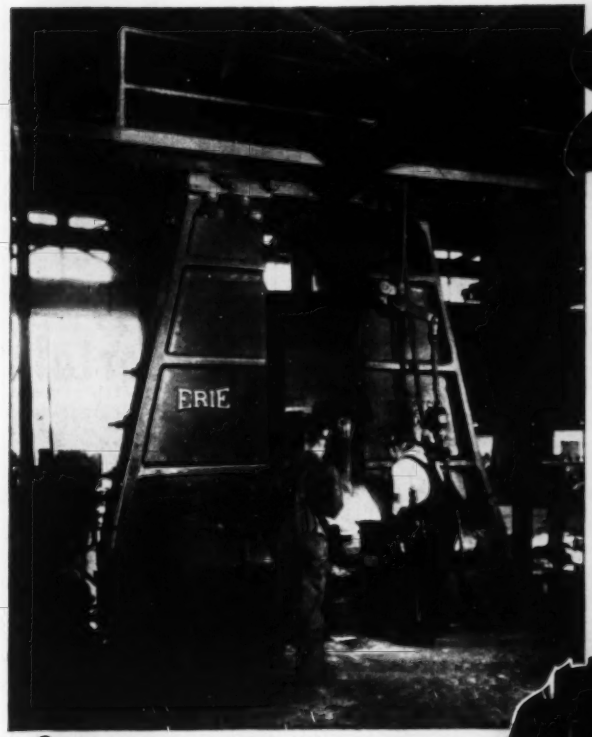
George E. Steudel, 67, retired division superintendent of blast furnaces for the former Carnegie-Illinois Steel Corp., Chicago, died Jan. 17. Since retirement two years ago, he has been consultant on blast furnace practice and iron metallurgy for **A. J. Boynton & Co.,** consulting engineer.

George I. Allen, 78, at one time associated with **Park Drop Forge Co.,** Cleveland, and for many years Cleveland district sales manager of **Heppenstall Co.,** died at his home in Cleveland Heights, O., Jan. 23.

Alvan Macauley, 79, former president and chairman of the board of **Packard Motor Car Co.,** Detroit, died Jan. 16 in Clearwater, Fla. He became president in 1916 and chairman in 1939, retaining the latter position until retirement in 1948.

Walter O. Briggs, 74, who founded **Briggs Mfg. Co.,** Detroit, auto body manufacturer, died Jan. 17 at his home in Miami Beach, Fla.

Martin L. Pulcher, 73, organizer of **Oakland Motor Car Co.,** Detroit, predecessor of Pontiac Motor Car Co., died Jan. 9 in Hollywood, Fla.

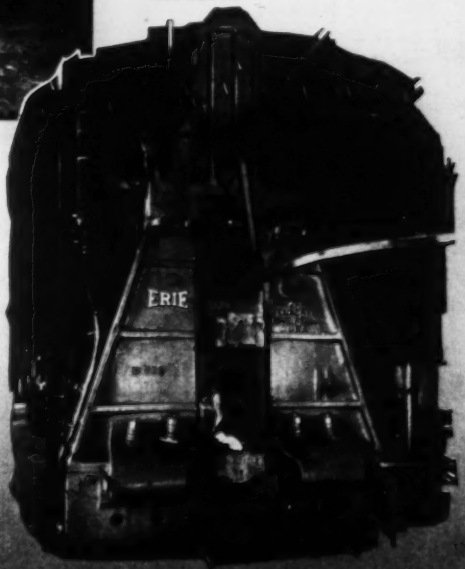


21 ERIE

STEAM HAMMERS HERE!

A large mid-western forge shop is making quality automotive forgings on 2 Erie Steam Hammers of 12,000 lb. rating, 10 Eries of 5,000 lb. rating and 9 Eries of 15,000 lb. rating. Why? Mainly because Erie Hammers are the choice of experienced Hammergangs and of the management men who pay the bills. Rugged Dependability is the answer—Erie Hammers produce profitably!

On Erie Hammers all stressed parts, frame, anvil, upper works are steel.



9 - 15,000 lb.

2 - 12,000 lb.

10 - 5,000 lb.

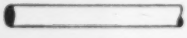
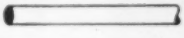
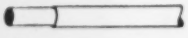
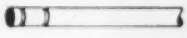
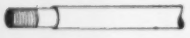
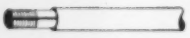
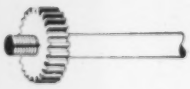
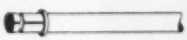
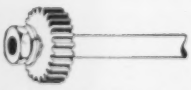
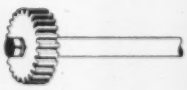
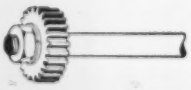
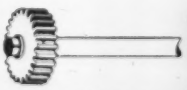
ERIE

Write for Bulletins Describing in Detail Erie Steam Drop, Board Drop, Single and Double Frame Forging Hammers, Pneumatic Hammers and Trimming Presses.

ERIE FOUNDRY COMPANY

Erie, Pa., U.S.A.

ERIE BUILDS *Dependable* HAMMERS

the old way	with RELIANCE Snap Rings
 Start with 1 3/16" round. *Weight per foot: 3.766 lbs.*	 Start with 1" round. *Weight per foot: 2.670 lbs.* **Saving per foot: 1.096 lbs.**
 Machine to 1" diam. for 2 1/4". *Machining time: 21.6 sec.*	 Machine Two Grooves .133" wide, .031" deep. *Machining time: 6.24 sec. (if machined individually).* **Saving: 22.75 sec.** *Machining time 3.12 sec. (if machined simultaneously).* **Saving: 25.87 sec.**
 Thread End 1 1/4". *Machining time: 7.5 sec.*	
 Machine Keyway.	Machine Keyway.
 Apply Key and Gear.	 Snap first Reliance Ring in position.
 Apply spring lock washer and nut.	 Apply Key and Gear. **Saving: 1 lock washer.**
 Wrench nut tight.	 Snap second Reliance Ring in position.

you can save time, money, critical materials *this way*

There are two ways of mounting a gear or pulley on the end of a shaft:

You can do it the old, costly, steel-wasting way, starting with a shaft slightly larger than the bore and machining the end to take the hub and nut. Starting with 1 3/16" round steel and turning the end down to 1" diameter for 2 1/4", machining and threading will require at least 29 seconds, using a 2" wide form tool.

Or, you can use 1" round, machine .133" x .031" grooves each side of the hub and slip a husky, heat-treated Reliance Snap Ring into each groove. Machining grooves individually takes approximately 6 1/4 seconds. (3 1/8 seconds if machined simultaneously.)

- you save at least 22 seconds of machining.
- you save over a pound of steel per foot of shaft length.
- you save the cost of a lock washer under the nut.
- you save on bearings since you can use 1" bearings instead of 1 3/16".

It requires less time to insert two Reliance Snap Rings than it does to wrench the nut tight.

Snap ring is easily removed to adjust the gear or pulley and can be re-applied.

Wherever your production requires shoulders—on shafts or in bores—Reliance Snap Rings, made of heat-treated cold-finished steel, can speed production and effect substantial savings. Write for bulletin.

EATON

ATON MANUFACTURING COMPANY

RELIANCE RINGS

RELIANCE DIVISION, MASSILLON, OHIO

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal

Production AND Engineering NEWS AT A GLANCE

ROTARY CUTTING—Novel lathe-type cutting tool in the form of a disk rotated about its central axis appears to have an edge over oblique tools in at least two respects: The rotary tool provides a rest period during which the cutting edge has a chance to cool adsorbed film of air or fluid can be replenished. It also enables the relative chip velocity to be increased. This means a lower coefficient of friction without a corresponding increase in rate of metal removal. Under optimum conditions, total power for a given rate of cutting is about 30 per cent less with a rotary tool than with a corresponding stationary tool. At the same time the rotary tool temperature is about 400° cooler than that of a conventional tool. Rotary cutting might be used where large volumes of metal must be removed fast. It could be applied to large planers and shapers as well as to rough-turning operations.

SPOT TESTS ALUMINUM—Identification of constituents in aluminum alloys is simplified by a spot test using reagents and test equipment which can be carried in a small kit. Nontechnical persons can understand the testing procedure; they will have no trouble interpreting results. Some alloys identifiable by the nondestructive technique are high purity aluminum, 99.5 per cent aluminum, electrical conductor aluminum, 2S, 3S, 4S, 52S, 14S, 24S, 61S, 72S and 75S. p. 67

STAINLESS PAINT—Flakes of stainless steel in a suitable vehicle make a desirable paint for electrical equipment, Westinghouse researchers say. The paint has excellent resistance to certain types of corrosion. For example, stainless is able to withstand alkaline atmospheres. Hence around plants making or using alkali, transformers and other equipment may be better protected with stainless steel pigments. Applied to distribution transformers opposite a steel plant, the finish is in perfect condition after exposure for a year and a half.

PLASTIC TOOLMAKING—Lockheed Aircraft Corp. is using phenolic plastics to replace standard die metals, reducing toolmaking costs 25 to 75 per cent. Overall savings over metal dies average 40 to 50 per cent from economies in labor and material. One die formerly weighing 17½ tons is made in plastic in half the normal time. It weighs only 3500 pounds. A spherical nose skin is formed in 25 per cent less time because the plastic can be ground six times faster than the metal. Using plastic to make double-action draw dies, master models, drill jigs and assembly jigs for F-94 ducts, Lockheed cuts costs 25 per cent and builds this entire tool family in half the previous time. A 14-foot, one-piece liner for a P2V nose door replaces a 42-piece assembly and saves 1500 manhours of grinding and finishing.

SCRAP DETINNED—Answer to the critical scrap and tin shortage at one steel company is an integrated detinning plant. Annual capacity of the facility is 300,000 pounds of pig tin and 30,000 tons of bundled scrap. Detinned scrap from the tin mills can now be charged back into the open hearths without danger of contamination. p. 70

NEW FERRITES FOUND—New ferrites for magnetic-core materials for radio-frequency coils and transformers show high permeabilities and low power losses. Indications are that by using one of these ferrites a conventional i-f transformer of greatly reduced size and selectivity is possible. Engineers are now exploring the possibilities of using these materials for magnetic amplifiers and for replacing electronic tubes in high-speed computing machines.

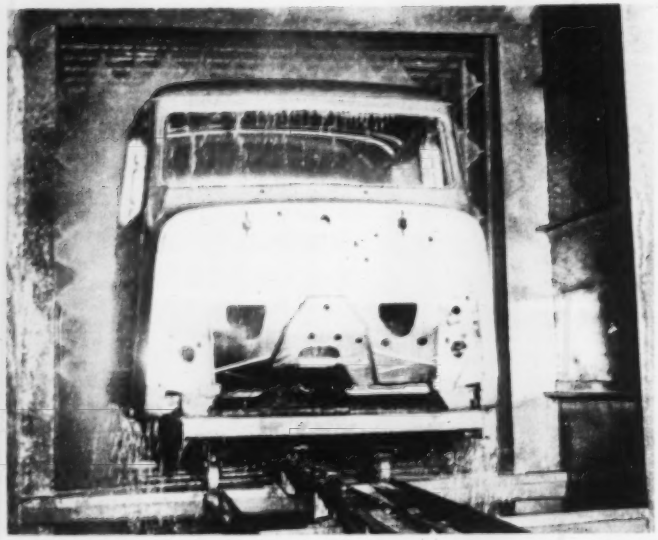
ZINC GUESSTIMATES—Gloomy forebodings of the imminent exhaustion of zinc, the American Zinc Institute says, appear to have been grossly exaggerated. Since 1931, in spite of the accelerated rate of depletion, measured reserves have actually increased substantially. Here's how the world reserves look, according to estimates given at the Institute of Metals meeting in London last fall. In 1931 estimated reserves were 27,000,000 metric tons; 1940—43 million, 1947—63 million, 1948—70 million. And in those years the world consumed 1,200,000, 2 million, 1,750,000 and 1,800,000 metric tons. So you can have your zinc and smelt it too.

PHOSPHATE PROTECTION—Versatile phosphate coatings are getting plenty of attention as designers and finishers cast about for substitutes for metal. Some applications: Paint bonding, corrosion prevention, wear resistance. Unusual lubricating qualities of phosphate coatings put them right in the middle of the metal extrusion picture. p. 74

X-RAY FOILS FLAWS—Radiographic inspection is standard procedure in the construction of Texas Eastern's 30-inch natural gas pipe line. Pictures are made by exposing film fastened around each weld in the pipe to a very small piece of radium held at the opposite side of the pipe. After a 10-minute exposure on one side of the pipe, the radium is moved to the other side for another 10 minutes. A complete picture is made of the entire weld structure. If any imperfections are present, they will show on the gamma ray exposed film.

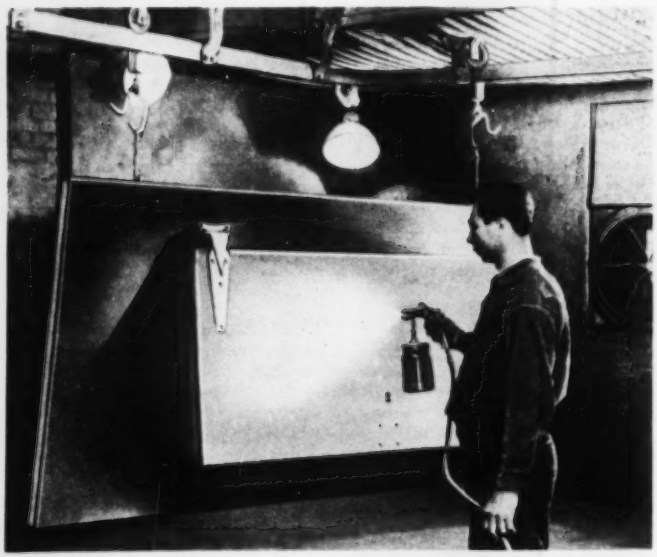
Metalworking Outlook—p. 27 *Market Outlook—p. 95*

PHOSPHATIZING ... *Versatile*



Phosphate coating a truck cab in a five stage spray machine at the main plant of Willys-Overland Motors, Toledo, O.

Portable spray gun may be used to apply a paint-bonding zinc phosphate coating to large sheet steel products like this refrigerator assembly



AGAIN metal producers and fabricators turn to versatile phosphate coating for relief from the growing scarcity of metal for plated coatings. Phosphate coatings are saving the day in a variety of applications—paint bonding, corrosion prevention, wear resistance. They gain prominence in cold extrusion of metals, too.

Corrosivity of a metal affects life of applied paint coatings. Surface treatment is stressed in preparing metal for painting. Treatment forms a stable and nonreactive coating chemically combined with the base metal. It not only retards corrosion but provides greater adhesion of organic finishes. Illustration shows the difference in the surface of two steel panels, one only cleaned prior to painting, the other phosphate-coated after cleaning in preparation for the finish. Phosphate coatings reduce surface activity of the metal impending underfilm corrosion at the metal-paint interface. Spread of corrosion from scratched or abraded areas in the paint film is reduced.

Theory of Underfilm Corrosion—Electrochemical theory of corrosion postulates that a steel surface is not entirely homogeneous. It will develop electropositive and electronegative areas with different corrosion tendencies. Differences in chemical constitution and internal stresses make some areas cathodic with respect to others as soon as the surface comes in contact with a corrosive medium. In the rusting of steel, two reactions take place simultaneously upon its surface; ferrous ions pass into solution and hydroxyl ion or alkali, is formed.

On a painted steel surface, paint film loses its adhesion progressively over an ever widening area.

Substitute For Metallic Coatings

Shortage of metallic plating materials, frantic search for substitutes, military specifications that require them, heighten interest in phosphate coatings

Proper selection of conversion coatings goes a long way toward stopping spread of rust and alkali formation underneath paint film, even when it is scratched. Conversion coatings are nonmetallic, stop the flow of small electrical currents. Alkali does not migrate to the electropositive areas, nor does it become sufficiently concentrated to cause paint failures.

How Coatings Form — Manganese and zinc in dilute phosphoric acid are most commonly used for producing phosphate coatings. Van M. Darsey and Walter R. Cavanaugh, Parker Rust-Proof Co., propose a mechanism for coating in the zinc primary phosphate type of solution. Such a solution may react in the presence of water according to this equation:

$$3Zn(H_2PO_4)_2 + H_2O \rightleftarrows Zn_3(PO_4)_2 + 4\ H_3PO_4$$

Reaction is promoted by increase in temperature and agitation such as occurs in a spray application. Free phosphoric acid reacts with the ferrous surface to form primary iron phosphate and to liberate nascent hydrogen. Phosphate thus formed reacts with water to form secondary iron phosphate ($FeHPO_4$) and phosphoric acid. Reaction of phosphoric acid with the metal surface causes supersaturation in the phosphating bath and results in precipitation of secondary iron and tertiary zinc phosphate—the coating.

To prevent hydrogen released from slowing down the reaction by collecting as a film on the surface an oxidizing agent such as nitrate, nitrite, chlorate (accelerator) may be added to the bath to oxidize the hydrogen to water. Most adherent phosphate coatings on steel are those containing iron phosphate combined with the metal phosphate of the phosphating bath. Here's what takes place in zinc phosphate type of composition:

$$3Zn(H_2PO_4)_2 + Fe + 0 \rightarrow \underbrace{Zn_3(PO_4)_2 + FeHPO_4}_{\text{COATING}} + 3H_3PO_4 + H_2O$$

Protective value of phosphate coatings depends on continuity, thickness and density. Coatings require immersion of the articles in the phosphate solution for 30 to 60 minutes at 190 to 200° F. After phosphating, articles are rinsed and oiled. Affinity of heavy phosphate coatings for oil and wax enhances their corrosion resistance.

Protective effect is increased if coating is given an aqueous rinse in a weak chromic acid bath, then sealed with a rust preventive. Phosphate coatings for this purpose absorb and hold quantities of sealer, yet present a dry surface. If the surface is accidently chipped or scratched, rusting is confined to the exposed area.

Coating Nonferrous—Zinc and its alloys present a paint adhesion problem because they react with the vehicle of most organic coatings. They are phosphate coated before painting to inhibit corrosion and prevent reaction of the paint vehicle with the metal. Zinc and cadmium can be effectively phosphate-coated.

Surface conversion coatings provide a good base for an organic finish on aluminum. Phosphate coating permits use of a variety of paint compositions which cannot be used over untreated surfaces. One surface coating method for aluminum, Bonderite, reacts the aluminum in a metal acid-phosphate solution containing oxidizing agents. Fluoride accelerates coating action. Surface is converted to a finely crystalline nonmetallic phosphate coating. Process also coats zinc and steel and their alloys.

Wire drawing is facilitated by application of phosphate coating and a suitable coating prior to working

American Chemical Paint Co., Ambler, Pa., reports its Alodine process produces an amorphous phosphate coating on aluminum which provides a good paint base. It may be applied by immersion, by spraying in a five stage washer or with a brush. Processing time is about 1½ minutes for immersion and 30 seconds in a spray washer. Dimensions of parts are not changed. Zinc and steel parts can be processed along with alu-

minum in a spray washer. Lyfanite is a process for aluminum developed by the Neilson Chemical Co.

Friction Protection—Phosphate coatings reduce wear on bearing surfaces. One treatment consists of immersing iron and steel parts in a hot phosphating solution for 10 to 15 minutes. Bearing surface is converted to a nonmetallic oil-absorptive coating of iron and manganese phosphates.

Phosphate coating permits rapid break-in of new parts by preventing metal-to-metal contact and maintaining adequate oil on such surfaces. The mild abrasive properties of the manganese-iron phosphate coating help lap or wear the parts. Effect is enhanced by the absorption of a lubricating oil by the manganese-iron phosphate crystals. Etching action of coating solution produces a porous surface which improves the wearing qualities and leaves minute oil reservoirs.

Metals Extrusion—Drawing, extrusion and other forming operations can be improved by phosphate coatings. Nonmetallic phosphate crystals acquire a strongly adsorbed lubricant. Combination of adherent phosphate coating and adsorbed lubricating film possesses a low coefficient of friction.

Decrease in friction in drawing seamless steel tubing is so pronounced that greater reduction in tube size per pass is possible. Type and degree of draw determines the amount of phosphate coating. In one test, 178 eighteen-gage steel disks 35.5 inches in diameter phosphate coated were drawn into washing machine tubs without any splits or breakers. It was impossible to draw tubs from the same grade of steel without the phosphate coating.

Prevents Scratches—Phosphate coatings are being applied to flat-polished steel to prevent scratches and die marks in forming operations. Manufacturers of automobile bumpers have changed to this method.

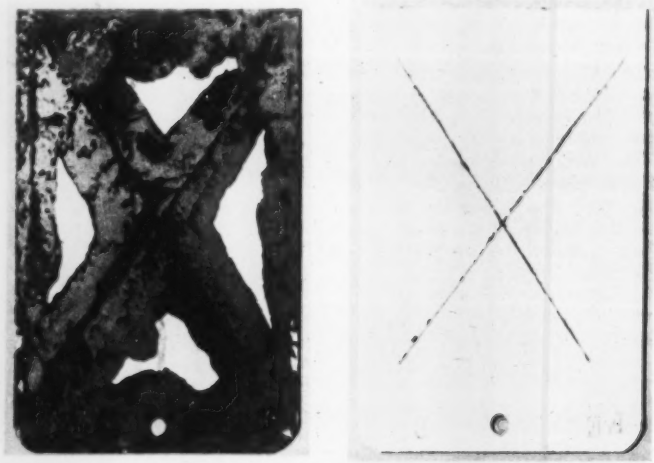
Saving resulting from the uniform and continuous film of lubricant on the bumper that reduces metal-to-metal contact are: Lower die cost; less down time on presses; increased production; fewer rejects. Type of phosphate coating used for this drawing operation is basically the same as for paint bonding.

Military Specifications—Protective finishes meeting U.S.A. 57-0-2; type 11, class A specifications, are manganese-iron phosphate coatings, treated with nondrying oils containing corrosion inhibitors, suitable for use on sliding, rubbing, or bearing surfaces. Finishes must withstand hour of salt spray exposure unoiled, 24 hours oiled.

To obtain finish, cleaned parts are immersed for 15 minutes in a hot balanced phosphate solution containing a nitrate accelerating agent until a uniform crystalline phosphate coating is formed. Parts are rinsed in clean water, then dilute chromic acid.

Protective finishes meeting U.S.A. 57-0-2; type 11, class B, specifications are zinc phosphate. They must be treated with a rust preventive containing corrosion inhibitors. Finishes are for nonmoving parts and shall be dry to touch. They must withstand 2 hours of salt spray exposure, unoiled, and 36 hours of salt spray oiled. For finish immersion time is 30 minutes with an accelerating agent, or 1 hour in hot, dilute phosphate solution without the agent until coating forms.

U. S. Army specification 57-0-2-type 11, class C (also Joint Army-Navy specification JAN-c-490; grade 1) covers bonding paint to metal. Finish must have a coating weight of 150 mg. After painting it must withstand 250 hours salt-spray test.



Steel panel on left was chemically cleaned prior to painting. Panel on right was cleaned and then phosphate coated prior to painting. Both were tested in salt spray. Phosphate coating preserves finish, retards under-film corrosion where the finish was scratched

Plastic Tooling Doubles Output

AiResearch Division, Garrett Corp., forms plaster cores for impeller blade assemblies in plastic molds. Molds have yielded an increase of 1300 per cent in parts produced per tool. Material used is Tool-Plastic, thermosetting liquid phenolic resin supplied by Rezolin Inc., Los Angeles.

Company states over 20,000 cores have been produced to tolerances of 0.005-inch using the plastic molds with no dimensional change in the parts and no sign of wear evident in the molds.

Hints Promote Furnace Care

Available from Hevi Duty Electric Co., Milwaukee, is a publication, "Maintenance Guide for Electric Heat Treating Furnaces." Booklet details in 16 pages, maintenance steps that prolong furnace life, and reduce repairs.

Discussed are proper inspection and maintenance of heating elements, fans and blowers, brickwork and insulation, thermocouples, and alloy retorts, muffles, etc.

Spot Testing Aluminum Alloys

Separation of different alloys in the field is simplified by an easily interpreted spot test that uses reagents and test equipment carried in a small, compact kit

By F. J. BOWEN
Division of Metallurgical Research
Kaiser Aluminum & Chemical Corp.
Oakland, Calif.

SPECTROGRAPHIC analysis is the easiest method that can be used for the identification of aluminum alloys. However, use of spectrographic equipment is limited by its very nature. Owing to the size and heat requirements of the equipment, aluminum samples must be brought to the spectrograph. In certain circumstances this assumes the proportions of Mohammed and the mountain.

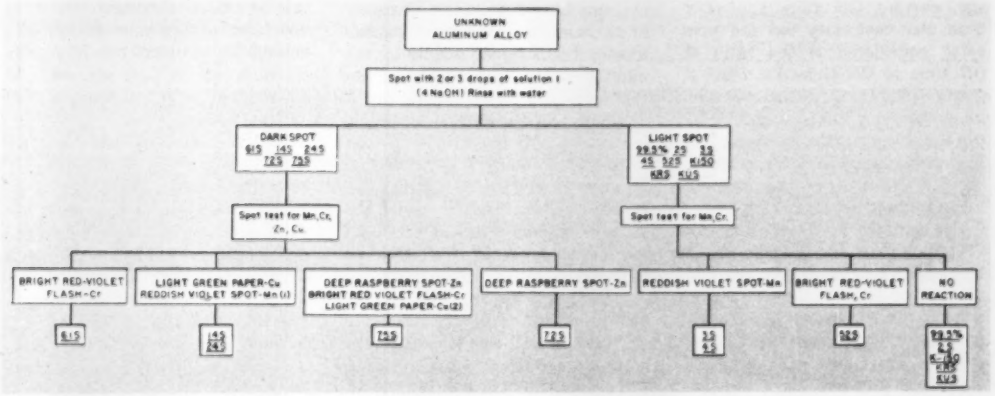
To simplify separation of different alloys in the field, Kaiser has developed a spot test technique that requires reagents and test equipment which can be assembled into a small compact kit. This kit can be used to differentiate between aluminum alloys by determining which, if any, alloying metals are present in aluminum products in substantial quantities. Although the presence of certain alloying constituents may be readily determined by spot tests, this system is aimed at those which are not common to a large number of alloys. Spot tests of this sort are not new. Probably the most widely known spot tests are those set forth by F. Feigl in his book *Spot Tests*.

Uses Sliver of Metal—Tests set up by Kaiser are based on those described by Feigl. However, use of microbeakers is recommended in those instances where spot tests might lead to doubtful results. In the microbeaker technique, only a small sliver of metal need be pared from an edge of the material in question. Chief value of this identification method is its virtually nondestructive nature. Furthermore, it is a systematic identification scheme for separating the most widely used aluminum alloys. Those which may be either wholly or partially identified by this technique are: High purity aluminum, 99.5 per cent aluminum, electrical conductor aluminum, 2S, 3S, 4S, 52S, K-150, roofing sheet, and utility sheet; as well as 14S, 24S, 61S, 72S and 75S.

In cases where clad material is involved, it is necessary to penetrate beyond the cladding to identify the core material. The Kaiser spot test procedure recommends that the edges of aluminum sheet products suspected of being clad be spotted with several drops of 4N NaOH or 85 per cent phosphoric acid. When the reagent is rinsed away after a few minutes of reaction time, the cladding should be clearly evident. There will be differences in color between cladding and core metal of sheets clad with 72S after reaction with 4N NaOH. Etching characteristics of several other claddings will dif-

(*Please turn to Page* 74)

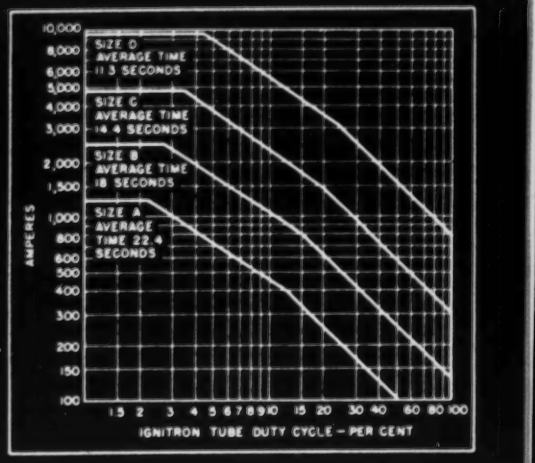
* F. Feigl, *Spot Tests*, Elsevier Publishing Co. Inc., New York.


UNKNOWN ALUMINUM ALLOY
Spot with 2 or 3 drops of solution I (4 NaOH) Rinse with water
DARK SPOT
615 145 245 725 75S
LIGHT SPOT
99.5% 25 35 45 525 K150 61S 61S
Spot test for Mn, Cr, Zn, Cu
Spot test for Mn, Cr
BRIGHT RED-VIOLET FLASH-Cr
LIGHT GREEN PAPER-Cu REDDISH VIOLET SPOT-Mn (1)
DEEP RASPBERRY SPOT-Zn BRIGHT RED VIOLET FLASH-Cr LIGHT GREEN PAPER-Cu(2)
DEEP RASPBERRY SPOT-Zn
REDDISH VIOLET SPOT-Mn
BRIGHT RED-VIOLET FLASH, Cr
NO REACTION
61S
145 245
725
725
35 45
525
99.5% 25 K-150 61S 61S

Flow chart for spot testing aluminum alloys. (1) The Mn test may be faint or entirely lacking. (2) The Cu test will be faint in 75S when compared to the definite green in the 14S-24S group

By W. E. LARGE
Electronic Control Engineer
Westinghouse Electric Corp
Buffalo

How to get More out of RESISTANCE WELDING CONTROL



Welder ignitron rating curves, 220-v applications

CAPACITY of your resistance welding equipment may be extended to handle heavier loads. The several systems designed to achieve this result, more fully utilize the advantages of the ignitron as a high-current switch, maintaining the same precise control of the welding current.

Ordinary Applications — To determine the required ignitron size for the ordinary welding job, it is necessary to know only the voltage, current ON time and OFF time. Per cent duty for the tube being considered is the ratio of ON time to ON-plus-OFF time, if the ON-plus-OFF time is less than the averaging time specified by the manufacturer on the tube rating curve. If greater, the per cent duty is the ratio of the ON time to averaging time.

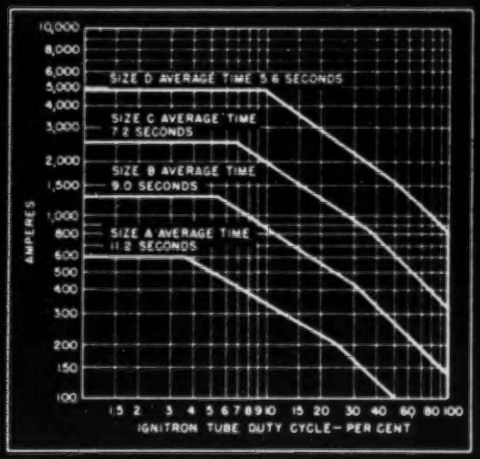
For example, a job requiring 300 amp at 440 v for 0.5 second, or 30 cycles on a 60-cycle basis, with an OFF time of 2 seconds can be handled by B size tubes, for the per cent duty is 20 per cent. However, B size tubes will not carry a load of 300 amp for 4 seconds, with an OFF time of 20 seconds, even though the overall duty cycle is still 20 per cent. This is because the total ON-plus-OFF time exceeds the 9-second averaging time. The per cent duty to be used in this case is the ratio of ON time to averaging time, or 44 per cent. Size C tubes will easily handle this job, for at duty cycle of 4/7.2 or 56 per cent, size C is rated at 600 amp for 440 v.

Heavy-Current Applications—It is possible, by selection of the proper system, to double the capacity of a welding control. Successful installations of all these systems have been made. Capacity of an existing welding control can usually be increased simply by the addition of another electronic contactor and a paralleling reactor assembly or flip-flop control circuit.

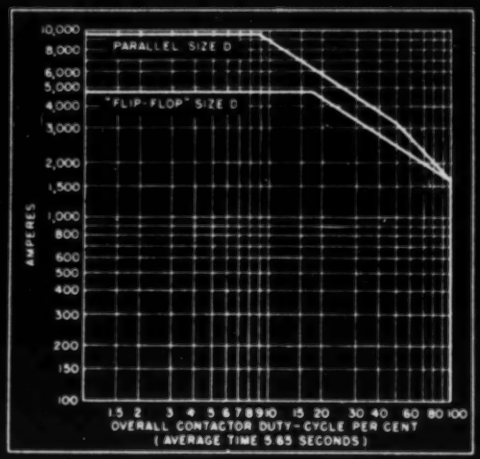
Flip-Flop Control — Flip-flop control uses two electronic contactors and a transfer relay apparatus which switches the ignitor circuit of each contactor alternately ON and OFF. The two sets of ignitrons are connected in parallel. Each set carries the welder transformer current during the time its ignitor circuit is closed. Transfer relay's contacts are arranged to make before break so that current flows uninterrupted during transfer. Apparatus controlling the transfer relay is usually of the electronic type, and is adjustable so that the current flows for the same length of time in each set of ignitrons. Thus the duty cycle of each electronic contactor is one half of the overall duty cycle of the control.

Consider a welding load of 3000 amp for 1.4 seconds at 440 v. With an averaging time of 5.6 seconds at this voltage, D size tubes would be operating at a duty cycle of 1.4/5.6, or 25 per cent. This far exceeds the capacity of a single set of tubes which have a rating of 2400 amp at 25 per cent duty. However, if a flip-flop control is used, the transfer relay control can be set so that each set of D size tubes carries current only 0.72 second. This reduces the duty cycle on each set to 12.5 per cent, at which duty D size tubes can carry 3800 amp.

Thus the flip-flop system gives added capacity over a single set of tubes with a minimum additional investment in control. It has the disadvantage of utilizing the full capabilities of the ignitrons only at 100 per cent duty, for at duty cycles less than 100 per cent the rating of the flip-flop control is less than twice the rating of a single set of tubes at the same duty. Also the peak rating of a


SIZE D AVERAGE TIME 5.6 SECONDS
SIZE C AVERAGE TIME 7.2 SECONDS
SIZE B AVERAGE TIME 9.0 SECONDS
SIZE A AVERAGE TIME 11.2 SECONDS
AMPERES
IGNITRON TUBE DUTY CYCLE—PER CENT

Welder ignitron rating curves, 440-v applications



Electronic contactor ratings, 400-500-v, 25 to 60 cycles

flip-flop control is limited to that of a single set of tubes. Another disadvantage is that the operation depends upon the mechanical action of the transfer relay. Maintenance of this relay for the large number of operations required is a problem.

Parallel Tubes—With the addition of anode reactors, two sets of tubes connected in parallel will have a current capacity double that of a single pair of ignitrons at any duty cycle.

Anode reactors are needed to produce sufficient voltage across one tube to fire it after the other starts conducting. They also split the current between the two sets of tubes. Since the current divides evenly between each set of tubes, maximum current in each set at any time is only one half the total. In the flip-flop control even though conducting only half the time, each set of tubes carries the peak load current. This results in a lower rating for flip-flop than for parallel tubes at any duty less than 100 per cent.

Consider a load of 4000 amp for 1.9 seconds at 440 v. This is a duty of 1.9/5.6, or 34 per cent. At this duty the capacity of a flip-flop control is only 3150 amp, but the rating of parallel tubes at 34 per cent duty is 4050 amp, sufficient to carry the load.

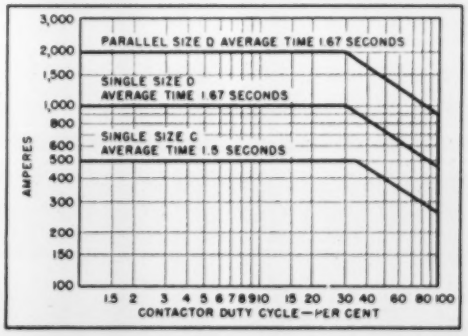
Parallel-tube control has a higher rating than the flip-flop system, and no mechanical relay operation requiring maintenance is involved.

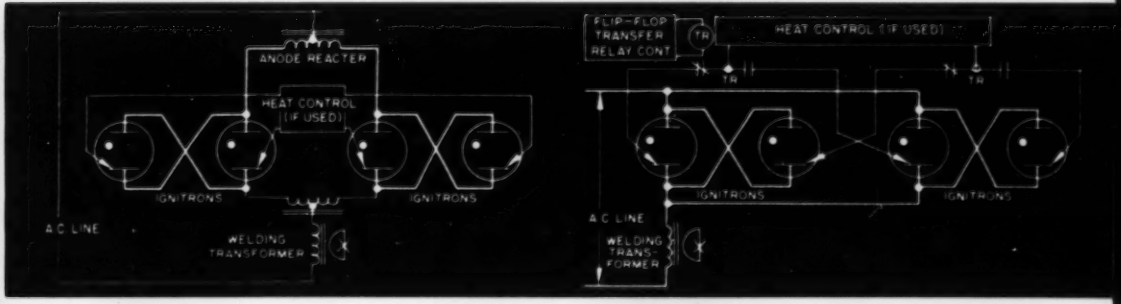
(*Please turn to Page* 81)

Right — Electronic contactor ratings, 2500-volts, 25 to 60 cycles

Lower right — Flip-Flop system

Below—Parallel tube system


PARALLEL SIZE D AVERAGE TIME 1.67 SECONDS
SINGLE SIZE D AVERAGE TIME 1.67 SECONDS
SINGLE SIZE C AVERAGE TIME 1.5 SECONDS
AMPERES
CONTACTOR DUTY CYCLE—PER CENT



More Scrap, More Tin... Detinning Produces Both

Weirton Steel's new plant recovers annually 300,000 pounds of pig tin and 30,000 tons of bundled scrap

FIRST detinning plant ever built as a steel company facility is now in regular operation at Weirton Steel Co., division of National Steel Corp. The plant was installed to conserve the company's stock of scarce tin and also to recover scrap from the tin mills which formerly could not be used in open-hearth operations, because the coating is a contaminant.

30,000 Tons of Scrap — Annual capacity of the detinning plant is rated at 300,000 pounds of pig tin and 30,000 tons of bundled scrap. There is an additional recovery of tin through processing of sludge that accumulates in the plating cells of the company's high speed electrolytic lines.

The new detinning plant is housed in 70 x 465-foot, main building and in several servicing lean-to buildings, all of which were recently erected on a site adjacent to the company's 10-inch and 16-inch strip steel plant. The facilities include a number of innovations specifically developed for the job by the Weirton research and engineering departments.

Raw material for the plant consists mainly of baled scrap brought by rail from the tin mills. Some additional tin plate scrap is also purchased from outside sources. In the method of electrolytic tin plating used at Weirton, coils are side-trimmed after they leave the plating lines.

Scrap produced in the trimming operation is baled for convenient handling. It constitutes a substantial proportion of the total scrap material processed in the detinning plant.

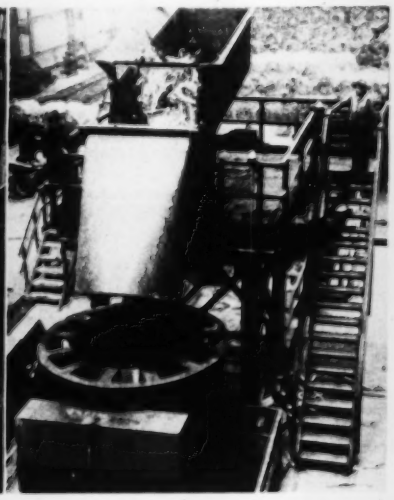
Bales Sawed Open — First problem in engineering the new plant was the development of a method for opening the bales, so a maximum amount of the scrap surface could be exposed to the detinning solution. This was solved by cutting the bales open with an electrically-driven 26,000 fpm friction saw.

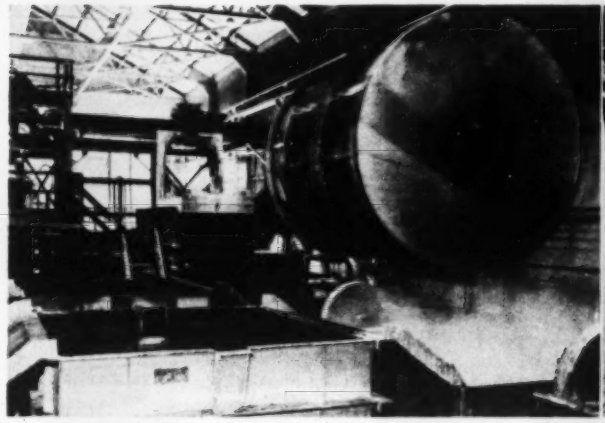
Following this operation, the scrap is further loosened when it is picked up by magnet crane and dropped into the charging hopper. The hopper is loaded in horizontal position and turned to vertical position to discharge the scrap into detinning drums.

The cylindrical steel drums are 8 feet in diameter and have an

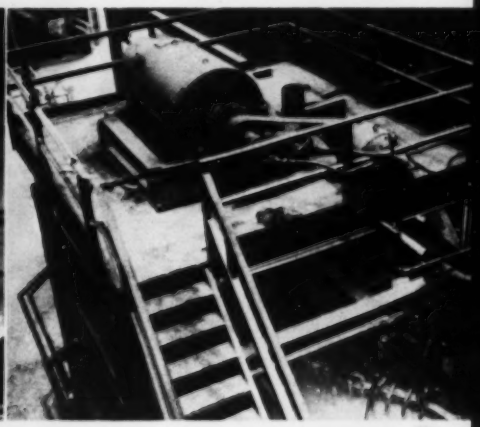
Opening baled tin mill scrap with 26,000 fpm friction saw exposes scrap surface to detinning solution

Discharging loosened scrap from collection hopper into detinning drum. Average charge is 5400-6000 pounds





Drum is transferred by overhead crane from detinning tank (right) to rinse tank (left)



Bird filter for separation of solid matter (sodium stannate) from detinning solution

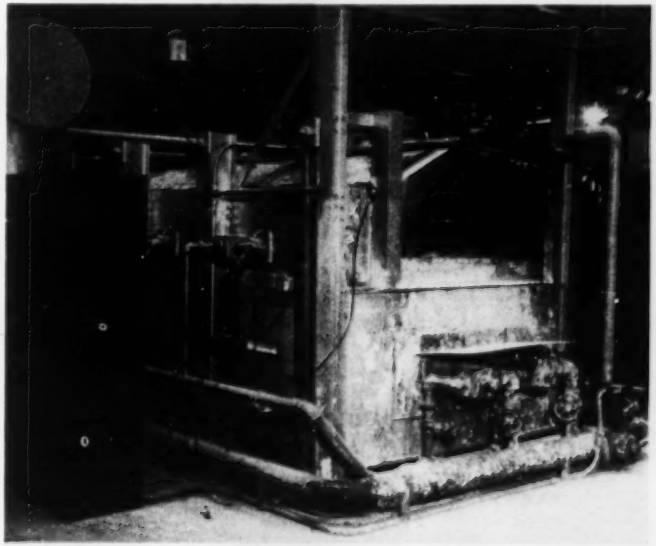
axis of 11 feet. On the long dimension, the drums are covered with heavy wire mesh screen. The end plates are solid, one being fixed and the other removable. A scrap charge averaging from 5400 to 6000 pounds is discharged from the hopper into the drum after which the drum is lowered to horizontal position, and the removable end plate bolted in place.

Drum is then picked up by crane and conveyed to one of five detinning tanks and placed in position on four flanged wheels mounted from the tank bottom. When the drum is placed in the detinning tank, it automatically engages a coupling which is driven by an electric motor through a gear reducer at a maximum speed of one revolution per minute. During the detinning operation, the tank is covered with a removable hood. The detinning tanks are 12 feet 9 inches long and 10 feet wide, with bottoms sloping toward the outlets, at which point the tanks are 6 feet 6 inches deep.

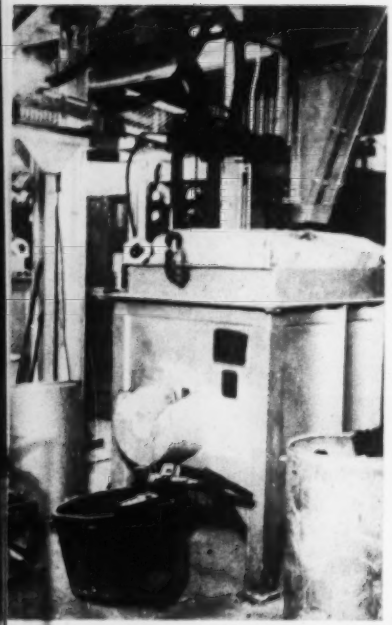
Detinning reagent is a 50 per cent solution of sodium hydroxide with additions of sodium nitrate. The sodium hydroxide is pumped from a 16,000 gallon storage tank located outside of the building. Sodium nitrate in a solid form is added manually. A closed coil steam system heats the solution to 195° F.

Process Time 2½ Hours—Following the detinning process, which requires 2½ hours, the drum is removed from the detinning tank and plunged into two rinse tanks to clean the detinning solution from the scrap. When there is a moderate concentration of chemicals in the rinse tanks, the rinsing fluid is used for makeup of the detinning solution.

After the process scrap is cleaned, it is discharged from the drum onto a table from which it is fed into a hydraulic scrap baler which compacts the loose steel into rectangular bundles weighing from 350 to 450 pounds. Bundles move from the scrap press automatically by conveyor belt through a wall opening to gondola cars stationed outside of the building. They are shipped in two-car lots to the open



Gas-fired calcining furnace for heating and drying damp filter cake from Sweetland filter to form tin oxide



Electric reduction furnace for final recovery of commercially pure tin

hearth department to re-enter the steelmaking cycle, providing a bonus quantity of a raw material in short supply.

Chemical reaction in the detinning process results in sodium stannate which is precipitated out of saturated solution in the form of a slurry. The slurry is pumped from the detinning tanks to a Bird filter which, by centrifugal action, separates solid matter from the detinning solution. The filtrate is returned to the detinning tanks, and the solids are continuously discharged into one of three rubber-lined dissolving and precipitation tanks (5500 gallon capacity) where the filtrate goes into solution with water.

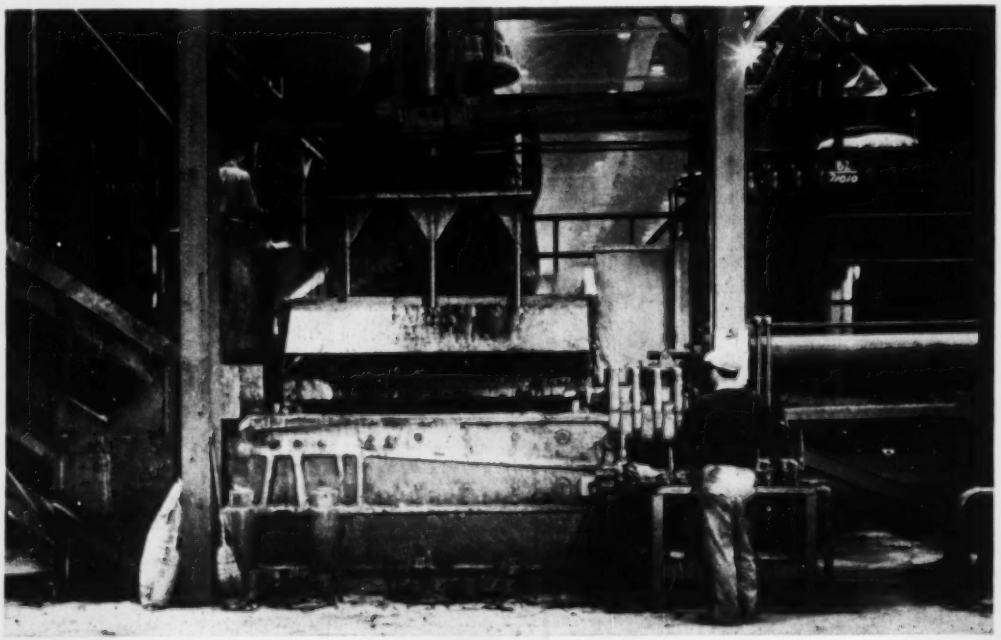
Solution is allowed to settle 2 hours after which the clear sodium stannate is decanted to a second tank in which it is treated with sulphuric acid to neutralize any remaining alkali. When the solution has been slightly acidified, there is an addition of sodium carbonate which results in tin hydroxide being precipitated.

Pumped From Tank—After decanting several times with water additions, the tin hydroxide, in the form of a thin slurry, is pumped from the precipitation tank to a Sweetland filter. After this process, it is rewashed, dried and discharged as a filter cake with a putty-like consistency. The damp filter cake is removed to a gas-fired furnace in which the material is heated and dried sufficiently to form tin oxide.

Tin oxide is cooled and mixed with fine anthracite coal in the ratio of approximately 4 to 1 by weight for charging into one of two electric reduction furnaces. In this operation, carbon unites with oxygen of the tin oxide to free commercially pure tin. The furnaces are tapped on a 6-hour cycle, and the molten tin is cast into 100-pound pigs for shipment to the tin mill.

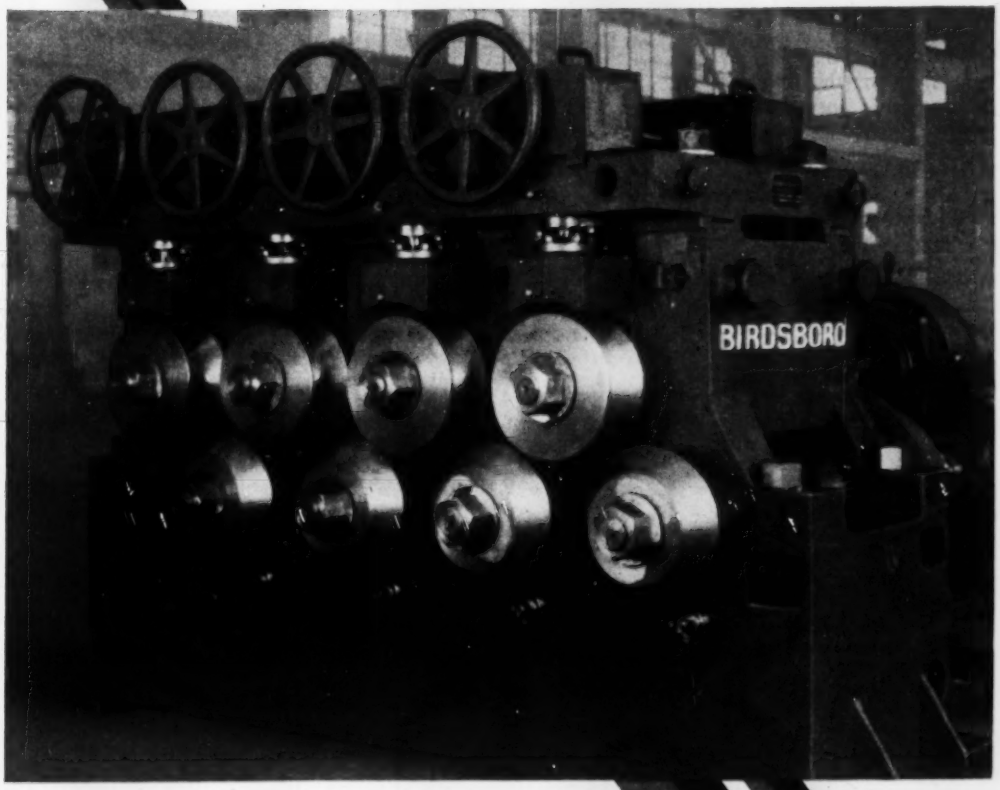
Tin recovery plant at the tin mill virtually duplicates on a smaller scale the facilities of the detinning plant from the precipitation tanks through the reduction furnaces. The material processed is the sludge that accumulates in the plating cells of the electrolytic lines which is pumped through a system of tanks and piping to the recovery plant. Operation of the two conservation setups is paying big dividends for Weirton.

Hydraulic scrap baler compressing recovered steel scrap into rectangular bundles for use in open hearths



EASIER ROLL ADJUSTMENT

Means Faster Straightening



You can eliminate downtime for roll settings because *all adjustments can be made while this angle straightening machine is in operation.* All top rolls are axially and vertically adjustable with one being driven through a slip clutch and universal spindle. All bottom rolls are axially adjustable—and all are driven.

If you are producing angles up to 3" x 3" x ½", this BIRDSBORO straightener of the overhung type is your answer to today's demand for increased output. Here is one more typical example of BIRDSBORO's advanced engineering which you are invited to call on at any time to help solve your rolling mill problems.

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Spot Testing Aluminum Alloys

(*Concluded from Page 67*)

fer from those of the core metal after the 85 per cent H_3PO_4 is rinsed away.

Easy to Apply—Procedure to be followed in using spot test system can be readily understood by nontechnical persons who will have no difficulty, barring color blindness, in interpreting the results.

Preliminary Separation—Place two or three drops of solution 1 (4N NaOH) on a freshly scraped or abraded metal surface, and allow it to react for 4 minutes. Rinse off the excess solution and examine the spot. Two general classifications may be made at this point: (a) Light spot (white or gray) as a result of an etch. H.P., 99.5 per cent E.C., 2S, 3S, 4S, 52S, K-150, KRS, KUS. (b) Dark spot (gray to black) 14S, 24S, 61S, 2S, 72S, 75S, (75S produces prominent black spot and may be noted in a preliminary manner at this point).

Alloy Spot Tests—1. *Manganese*—This test may be made on a freshly abraded surface or on scrapings in a microbeaker. Put three or four drops of solution 1 (4N NaOH) in one spot on the metal and allow it to react for 2 to 3 minutes. Add two drops of solution 2 (2 per cent silver nitrate) and a few crystals of ammonium persulphate to the wet spot. Warm gently over a flame for several minutes.

Manganese is present if the reddish violet color of permanganate appears.

2. *Chromium*—This test should be made on a sliver of metal cut from an edge with the knife in the kit. The sliver should be 3/16-inch long and 1/16-inch in diameter, or an equal volume of metal. Place the sliver in a microbeaker.

Treat the metal with five drops of solution 1 and allow 3 minutes for reaction time. Next add two drops of solution 2 (2 per cent silver nitrate) and 3 drops of solution 3 (1:1 HNO_3). If the liquid in the beaker turns dark, or if a brown to black precipitate forms, add one or two more drops of solution 3. Final solution should be colorless or nearly so. Then add a few crystals of ammonium persulphate and allow a reaction time of 3 minutes. The solution will usually turn dark at this stage if chromium is present; it should be allowed to react for at least 1 minute after this darkening is noted. Finally, add one or two drops of solution 4 (diphenylcarbazide in alcohol).

If chromium is present, there will be a bright red-violet flash of color in the liquid in the beaker as soon as solution 4 is added. This color will disappear, and it will not be possible to regain it. If manganese is present the liquid will become red-violet before solution 4 is added.

3. *Copper*—Test for copper may be made on either the freshly abraded metal surface or on a scraping or sliver placed in a microbeaker. Place two or three drops of solution 3 (1:1 HNO_3) upon the metal and warm gently for 2 to 3 minutes. Then absorb the liquid in a strip of the benzoin oxime impregnated paper by dipping the paper into the solvent. To the spot thus formed on the paper, add two or three drops of solution 5 (conc. NH_4OH), or better still, expose the spot for several minutes to the fumes of solution 5.

If the spot on the paper turns light green, copper is present.

4. *Zinc*—This test may be made on the freshly abraded metal surface or on a scraping placed in a microbeaker. Allow the metal to react with three or four drops of solution 1 (4N NaOH) for 2 to 3 minutes. Next put the liquid on a filter paper circle, and add two drops of solution 6 (dithizone) to the spot on the paper. At the same time, make a blank test by placing two or three drops of solution 1 on another portion of the paper and add two drops of solution 6. Evaporate the excess solvent by warming or waving the paper.

If zinc is present, a deep raspberry-red color will appear on the test spot. This should be distinguished from the red-orange color of the blank spot.

Presence of zinc may be determined by an alternate method. First, spot the metal with three or four drops of solution 8 (1:1 HCl) and allow it to react for several minutes. Then add one or two drops of solution 9 ($CoSO_4$) followed by two or three drops of solution 10 (ammonium mercuric thiocyanate), stirring with a glass rod.

If a blue precipitate forms immediately, zinc is present in the metal. The test is not positive if more than 2 minutes are required for the blue color to appear.

In the experimental work which led to the establishment of this identification system, no satisfactory method was found for direct spot testing for magnesium. Most tests for magnesium rely upon the adsorption of a dye by magnesium hydroxide, and they are not specific under conditions which will precipitate aluminum hydroxide. In basic solutions where aluminum hydroxide does not precipitate, the aluminate interferes with the adsorption of the dye. For these reasons, the tests were designed to provide identification without resorting to the magnesium tests.

The accompanying flow chart shows the relationship between the tests as well as a list of the positive test results and the alloys or alloy groups which the results identify.

CONTENTS OF SPOT TEST KIT

I. Nine small bottles of prepared solutions (preferably with medicine dropper caps), all reagents should be at least CP (chemically pure) grade, preferably Analytical Reagent quality.
   1. 4N NaOH—Dissolve 16 g of analytical grade sodium hydroxide in 100 ml of water.
   2. 2% $AgNO_3$—Dissolve 2 g silver nitrate in 100 ml of distilled water. Store in dark bottle.
   3. 1:1 HNO_3—Dilute concentrated nitric acid with an equal volume of water.
   4. Diphenylcarbazide—Dissolve 0.5 g diphenylcarbazide in 100 ml of ethyl alcohol. Store in a dark bottle. If stock solution turns red or violet, it should be replaced.
   5. Concentrated NH_4OH — Concentrated ammonium hydroxide, 28.0% NH_4OH, sp gr 0.90.
   6. Dithizone—Dissolve 10 mg dithizone in 100 ml of carbon tetrachloride. Store in brown bottle.
   7. 1:1 HCl—Dilute one volume of hydrochloric acid with an equal volume of distilled water.
   8. $CoSo_4$—Dilute 4 ml of concentrated hydrochloric acid to one liter of distilled water. To 100 ml of this solution, add 20 mg of cobalt sulfate.
   9. Ammonium Mercuric Thiocynate — Dissolve 8 g mercuric chloride and 9 g of ammonium thiocyanate in 100 ml of distilled water. Allow to stand for several days before using.

II. A small bottle of crystalline ammonium persulphate.

III. A small bottle of strips of impregnated paper—Dissolve 10 g benzoin oxime in 100 ml of either methyl or ethyl alcohol. Impregnate S&S 489 filter paper in this solution by soaking strips of paper for 30 minutes. Air dry the strips and store them in a dark bottle.

IV. A package of untreated S & S 489 filter-paper circles.

V. Several pieces of miniature equipment
   1. Three microbeakers (5 ml)
   2. Nine medicine droppers (if dropper caps are not used on the solution bottles)
   3. A sharp, short-bladed knife
   4. A cigaret lighter

SCIENCE NEWS FOR YOUR HEAT-TREAT

Scientists have long known that the electrical resistance of a piece of steel will change whenever there's a change in the carbon content of the metal. This basic fact is now being put to work by many progressive metallurgists and heat-treaters. For L&N has applied the principle in a brand-new Primary Element called a Carbohm. In use, a Carbohm projects into the heat-treating furnace . . . looks rather like a thermocouple. Whenever the amount of active carbon in the furnace gas begins to increase or decrease, the Carbohm detects the change. An automatic controller connected to the Carbohm throttles the carbon supply up or down, to keep the furnace gas at desired strength. And a Micromax Recorder plots the result . . . as easy to read as a record of temperature.

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DESULPHURIZATION...Worth Watching

There may be room for improvement in your desulphurization methods. Close scrutiny of procedure can pay dividends in better sulphur reduction

By WILLIAM W. AUSTIN Jr.
Senior Metallurgist, Southern Research Institute, Birmingham, Ala.

ADD to the iron and steel producers' problems the growing one of high sulphur content. Fault lies with unavoidable use of high-sulphur fuels. As a result, many metallurgists are reviewing desulphurization procedures. Not helping the situation is the critically short supply of manganese. Bushes are being beat for substitutes. Recent investigation indicates zirconium and titanium may be used in ferrous metals containing little or no manganese.

Although basic slag sulphur removal has long been recognized as effective, investigation shows desulphurization efficiency in blast furnaces is low. Present practice does not utilize full desulphurizing capacity of the blast furnace. Sulphur contents of iron samples at equilibrium with blast furnace slags were found to be as low as 0.005-0.10 per cent S. Normal sulphur content in pig iron ranges between 0.020 and 0.05 per cent S.

Rotary Furnace Helpful — Kalling and co-workers in Sweden use a rotary furnace in which molten metal to be desulphurized is vigorously agitated with predetermined quantities of powdered burnt lime and coke. Process introduces refinement heretofore lacking in commercial desulphurization equipment. Indirect arc heating plus simultaneous agitation, gives positive control over the entire desulphurization cycle.

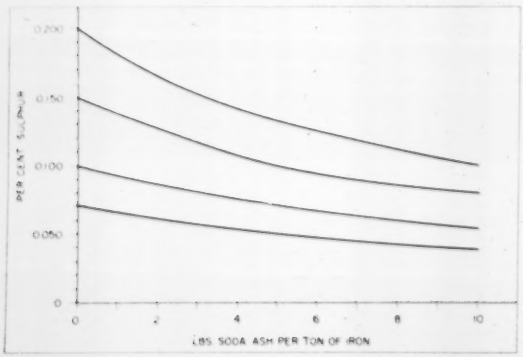
Phenomenal desulphurization results are reported and the process appears economically promising. Sulphur reduction from as much as 0.200 per cent to less than 0.010 per cent S results from a 20 to 30 minute treatment with 2 per cent lime and 1 per cent coke breeze in the rotary furnace. An initial sulphur content of 0.100 per cent can be reduced to 0.005 per cent S using 1.3 per cent lime and 0.4 per cent coke breeze.

Alkali Desulphurization — For routine desulphurization of cast iron, most widely used are soda ash and caustic soda. Nevertheless there are several disadvantages with these desulphurizers. Both are extremely active chemically and are volatile at molten iron temperatures. They produce obnoxious toxic fumes and cause furnace and ladle refractories to corrode. Both are important raw materials for the chemical industry and frequently are in short supply. However, they are sufficiently effective and economical as desulphurizing agents to justify widespread foundry use.

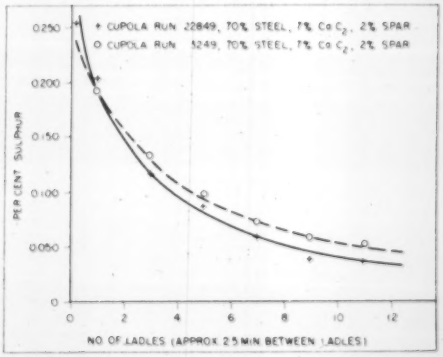
Extent of sulphur reduction that may be expected from soda ash is shown in an accompanying chart. These results are normally obtainable when desulphurizing cupola-melted gray cast iron in a teapot holding ladle or forehearth. Four curves indicate desulphurization expected with increasing additions of soda ash.

Recent shortages of soda ash has led to use of trona, a naturally occurring, impure form of soda ash, known technically as sodium sesqui-carbonate. Since trona contains only about 40 per cent of

Relation between expected sulphur content and soda ash consumption in a conventional ladle with continuous tapping and intermittent soda ash additions



Desulphurization with calcium carbide in the basic cupola. Seven per cent calcium carbide and 2 per cent fluorspar is added to the cupola charge



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the active desulphurizing agent, Na_2O, it is less effective than manufactured soda ash. It contains approximately 20 per cent combined water which further impairs its effectiveness, and may act as a source of hydrogen contamination.

Reladling Effective—One of the most efficient applications of alkali desulphurizers is reladling treatment in which better than 90 per cent removal of sulphur from 0.125 per cent cast iron is accomplished with as little as 0.75 per cent caustic soda. In this process, a predetermined weight of caustic soda is added to the molten iron as it is tapped into a conventional ladle. This ladle is poured into a hooded ladle to produce thorough and violent agitation of the slag and metal. Desulphurized iron is separated from the slag by a special nozzle in the side of the hooded ladle which permits bottom pouring when ladle is tilted. Temperature drop in the process averages less than 200° F. Better than 80 per cent sulphur removal is obtained with 0.37 per cent caustic and over 90 per cent removal with the addition of 0.74 per cent caustic.

Desirable soda ash may be substituted for caustic soda in this reladling treatment with only slight impairment of results. Soda ash gives 83 to 87 per cent sulphur elimination. Where there is a low initial sulphur content, or maximum sulphur removal is not required, soda ash is more economical than caustic soda.

Basic Refractories—Basic cupola is not necessarily economically competitive with soda ash but it overcomes temperature drop and refractory corrosion disadvantages. Other advantages are increased metal temperature and resultant carbon pick-up. Possibility of dephosphorization is also cited as an added advantage of the basic lined cupola. Basic lined cupola is considered ideally suited for production of nodular graphite cast iron. Increased carbon pick-up in basic cupolas permits use of larger quantities of steel scrap than would normally be possible.

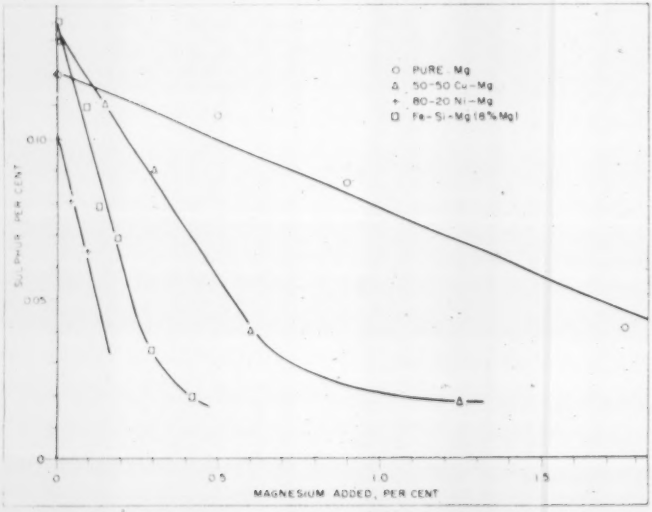
Magnesite Brick Aids — Magnesite brick is satisfactory for basic cupola linings. Comparative results on acid and basic materials reveal refractory consumption is less than one-third that of conventional clay brick on nine hour production melts. Improved refractory life in many applications justifies most of the increased cost of basic refractories.

In basic lined cupolas, sulphur content is lowered significantly by increase in basicity of the slag. Sulphur pick-up runs from 0.020 to 0.040 per cent lower than would be expected in an acid cupola. However, further reduction in sulphur requires lower FeO content in the slag as well as increased basicity. These conditions necessitate stronger reducing conditions than normally encountered even in the basic cupola. Increased basicity and strong reducing conditions are obtained through use of 1.5 to 7.0 per cent calcium carbide. Decrease in sulphur during progress of two cupola runs is shown graphically on p. 76. Charge consisted of 70 per cent steel, 30 per cent pig iron, with 7 per cent calcium carbide. Additions of 1 and 2 per cent fluorspar were included to improve slag fluidity.

Calcium carbide also results in substantially greater carbon pick-up and increased metal temperature. Increase in carbon pick-up is sufficient to produce 3.20 to 3.50 per cent carbon gray iron from all steel charges. Increase in temperature is sufficient to melt at 2900° F charges that could not be melted over 2800° F without carbide. Heat producing ability permits reductions in coke to one-third of normal coke ratios without sacrificing metal temperature and actually increases melting rate by as much as 40 per cent. With 7.0 per cent calcium carbide in the charge 70 per cent steel—30 per cent pig iron charges were melted and tapped at temperatures over 2800° F using only 4.0 per cent coke (25:1 iron to coke ratio).

Variety of Methods — Calcium carbide may be formed as in the basic electric furnace, may be employed as a ladle or spout addition after melting or may be injected directly into the molten bath in bath type furnaces.

Procedure is to introduce powdered calcium carbide into molten metal with sufficient agitation to provide intimate contact. In latest developments for this type of treatment, the powdered calcium carbide (30 x 200, or 30 x 100 mesh) is forced into molten metal in a stream of compressed dry nitrogen gas in a manner similar to air sandblasting. A graphite injection tube is used to convey the carbide into the molten metal. Carbide consumption for this applica-



Desulphurization with metallic magnesium. Curves indicate increasing desulphurizing efficiency with less combustible Ni-Mg and Cu-Mg alloys

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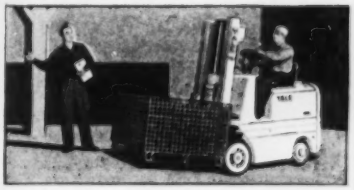
START

STOP

START



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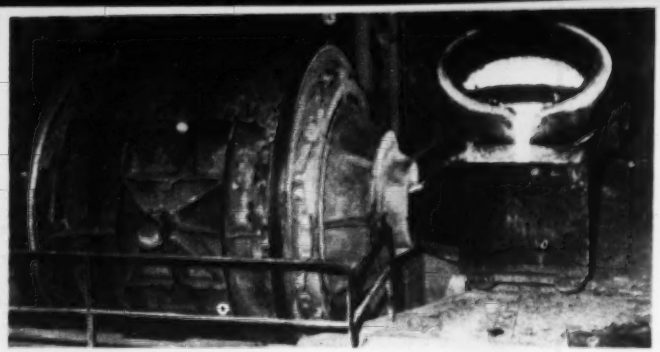


Rotary furnace for desulphurization of pig iron used by Professor Bo Kalling, Domnarvet, Sweden. Rotating agitation improves desulphurization efficiency

tion will average 5 pounds per ton of metal with 0.010 per cent sulphur removed, when treating 50-ton ladles of molten pig iron having initial sulphur content of 0.050-0.030 per cent S.

Advantages — Per ton cost of carbide injection is higher than soda ash. Carbide treatment nevertheless offers several advantages. There is freedom from obnoxious fumes and corrosive attack upon refractories, residue is a dry granular dross-like slag easily separated. There is no sulphur reversion if carbide slag remains in contact with the metal after treatment. With soda ash and caustic soda treatment sulphur reversion upon prolonged holding is an important consideration.

Calcium carbide injection for desulphurization of steel in acid and basic electric furnaces was recently described. No completely practical method for lowering sulphur content in acid lined steel furnaces has been reported heretofore. Typical acid heats were desulphurized from 0.085 to 0.045 per cent S from 0.075 to 0.038 per cent S, and from 0.030 to 0.019 per cent S. Conditions include proper deoxidation of the steel bath and removal of any slags high in silica or iron oxide. If low nitrogen content in the steel is desired, carbon dioxide can be satisfactorily substituted for nitrogen. A refractory-covered steel injection tube is used instead of the graphite tube.

In reducing sulphur from 0.075 per cent to 0.038 per cent in a typical acid heat, a per ton cost of $3.22 is computed. This cost includes 30.7 pounds of powdered calcium carbide, 8.5 cu ft of carbon dioxide and miscellaneous charges for injection pipe and additional power consumption. Results from carbide injection desulphurization of basic electric steel heats are substantially better than the acid heats.

Metallic Desulphurizing — Interest has been shown in various metallic elements for producing nodular graphite and for sulphur removal which accompanies conversion to nodular graphite.

Promise has been reported for cerium, magnesium, calcium, lithium, barium, and strontium. Use of cerium, lithium, barium or strontium for desulphurization alone is economically prohibitive. Calcium and magnesium are cheaper than the other elements, and may find commercial use as desulphurizing agents. Effectiveness of calcium is dependent upon temperatures in excess of 2800° F for satisfactory performance. Consequently practical use of metallic agents for desulphurization is limited to magnesium and its alloys.

Alloyed Magnesium Better—Extreme violence of magnesium combustion at molten iron temperature requires use of magnesium alloyed with other elements. On p. 78 reductions in sulphur contents of several base irons are plotted against additions of magnesium and various magnesium alloys. These curves show how desulphurization is improved by the addition of a suitable alloy rather than pure magnesium.

Improvement is due to the retarding effect of the alloying element upon magnesium combustion. With an appropriate alloying agent, oxidation losses are reduced, more of the active metal is available for desulphurization. Virtually all of the magnesium alloys recommended as addition agents, however, are violent in their behavior.

Cast iron can be desulphurized rapidly, with consistent results through ladle treatment with several magnesium alloys. Sulphur content may be controlled so that any desired amount may be removed or left in the iron. Conversion to nodular graphite occurs only when residual magnesium content exceeds 0.02 per cent Mg. In desulphurization with magnesium alloys, sulphur contents may be decreased to 0.02-0.03 per cent S before sufficient residual magnesium is retained to produce appreciable quantities of nodular graphite. At present prices, desulphurization of cast iron with magnesium is more expensive than conventional soda ash.

Miscellaneous Methods—Calcium cyanamide, appears to have merit as a desulphurizer. Both laboratory and foundry scale experiments are being conducted to obtain a reliable evaluation of its merit. The commercial product, containing 70 per cent calcium cyanamide and 12.5 per cent each of lime and free carbon, is an effective desulphurizer. Calcium cyanamide has been used experimentally in gray cast iron production, as a component of the cupola charge and as an addition agent at the spout, bull ladle and hand shank. Ladle additions of 1 per cent calcium cyanamide consistently resulted in reduction of 0.16 per cent intial sulphur to 0.075-0.09 per cent S.

In acid cupola practice initial sulphurs of 0.10-0.15 per cent S have been reduced to 0.08-0.10 per cent through the use of lump calcium cyanamide weighing 1 to 3 per cent of the metal charge. In the basic cupola final sulphur contents of 0.02 per cent S were obtained, a sulphur level substantially lower was obtainable without calcium cyanamide.

Laboratory experiments at Southern Research Institute with calcium cyanamide as a desulphurizer in making nodular graphite cast iron also show promise. Additions of granular calcium cyanamide are made to the cold charge in 250-pound induction furnace heats. During meltdown charge is thoroughly agitated while the cy-

anamide undergoes a thermal decomposition evolving nitrogen. This produces an effervescent effect that materially aids mixing and agitation of the charge. Substantial sulphur reductions result.

Lime and Fluxing Materials—Another development in ladle desulphurization involves the use of mixtures of lime, with certain fluxing materials to improve fluidity. Mixtures of lime and nepheline are satisfactory desulphurizing agents. Nepheline, a sodium aluminum silicate mineral similar to feldspar, has a low melting point and sufficient fluxing effect to form a readily fusible mixture with lime. A mixture containing 70 per cent lime and 30 per cent nepheline begins to solidify at 2370° F but is quite fluid at 2535 to 2590° F. Interaction between pig iron and the desulphurizing mixture is quiet, with no effervescence or evolution of gas. Desulphurization with 3 to 7 per cent of this mixture results in removal of 45-85 per cent of the sulphur content of a 0.11 per cent S pig iron.

Evidence of improved desulphurizing efficiency through agitation is shown by additional experiments at Southern Research Institute.

Resistance Welding Control

—CONCLUDED FROM PAGE 69

Cost of anode reactors is nearly the same as for the flip-flop transfer relay circuit. A simple voltage relay across the anode reactor stops operation of the control if one ignitron fails.

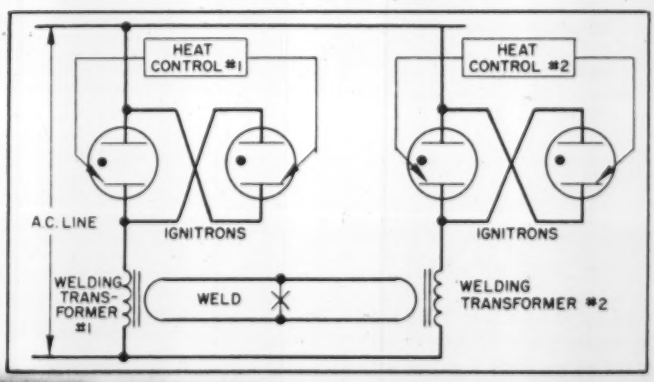
High Voltage Ignitrons—When welding load exceeds rating of the systems just described, it is often wise to consider use of 2300-v control, with ignitrons rated for that service. At certain duty cycles the total load kva which can be handled by a single set of high voltage tubes exceeds capacity of even parallel low voltage tubes.

For example, the kva rating of parallel low voltage tubes at 100 per cent duty is 1600 x 440 or 704 kva. At 100 per cent duty a single set of high voltage tubes will carry 450 x 2300 or 1035 kva. Twice this rating can be obtained by paralleling high voltage tubes.

Separate Welding Transformers—Under certain conditions it is possible to supply a single heavy welding load from two welding transformers using separate tube contactors in the primary of each. This method gives a load capacity equal to that of parallel tubes, but each application of this type must be investigated very carefully. When rating the tubes, it is practical to assume that both sets start conduction at the same time. Actually one set will always start slightly before the other because of the difference in the ignitor characteristics of individual ignitrons. When this occurs, the secondary voltage developed by the conduction of one set is reflected through the load into the other.

Reflected voltage opposes the line voltage across the tubes and must not be great enough to lower the resulting tube voltage below the value required to fire the second set of tubes, which is 200 v rms. This problem is not serious for 2300-v operation, but on low voltages it is usually better to consider parallel or flip-flop control.

Parallel transformer system



CALENDAR OF MEETINGS

† Denotes first listing in this column.

January 27-31, Associated Equipment Distributors Association: Annual meeting. Hotel Conrad Hilton, Chicago. Association address: 360 N. Michigan Ave., Chicago. Secretary: P. D. Herman.

January 28-30, Truck-Trailer Manufacturers Association: Annual meeting. Shamrock Hotel, Houston. Association address: 1024 National Press Bldg., Washington 4. Managing director: John B. Hulse.

January 31-February 1, American Society for Metals: Mid-winter meeting. William Penn Hotel, Pittsburgh. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

†February 1-2, National Tool & Die Manufacturers Association: First West Coast meeting. Hotel Ambassador, Los Angeles. Association address: 906 Public Square Bldg., Cleveland 13. Executive secretary: George S. Eaton.

February 7-8, Instrument Society of America, New York Section: Power plant symposium, Hotel Statler, New York. Society address: 551 Fifth Ave., New York 17. Secretary: Richard Rimbach.

February 11-15, National Sand & Gravel Association: Biennial meeting. Hotel Conrad Hilton, Chicago. Association address: 1325 E. St. NW, Washington 4. Executive secretary: Vincent P. Ahearn.

February 12, Chamber of Commerce of the United States: National conference on labor relations. Pittsburgh. Chamber address: 1615 H St. NW, Washington 6. Executive vice president: Arch N. Booth.

February 14-15, Foundry Educational Foundation: Technical and university advisory committees conference, Hotel Statler, Cleveland. Foundation address: Terminal Tower, Cleveland 13.

February 18-21, Automotive Electric Association: Annual meeting. Edgewater Beach Hotel, Chicago. Association address: 800 Michigan Bldg., Detroit 26. Secretary: S. W. Potter.

February 18-19, National Association of Aluminum Distributors: First annual meeting, Hotel Drake, Chicago. Association address: 905 Midland Bldg., Cleveland 13. Executive secretary: Raymond L. Collier.

February 18-20, National Crushed Stone Association: Annual meeting. Hotel Conrad Hilton, Chicago. Association address: 1415 Elliot Place NW, Washington 7. Administrative director: J. R. Boyd.

February 18-20, American Management Association: Personnel conference. Palmer House, Chicago. Association address: 33 W. 42nd St., New York.

February 18-21, American Institute of Mining & Metallurgical Engineers: Annual meeting. Hotel Statler, New York. Institute address: 29 W. 39th St., New York. Secretary: Edward H. Robie.

February 21-22, Society of the Plastics Industry (of Canada) Ltd.: Annual conference, Royal York Hotel, Toronto. Society address: 67 W. 44th St., New York 18. Executive vice president: William T. Cruse.

February 25-28, Materials Handling Conference: Purdue University, sponsor. Address: W. Lafayette, Ind.

February 25-28, Industrial Ventilation Conference: School of Engineering, Michigan State College, E. Lansing, Mich. Secretary: K. E. Robinson, Division of Industrial Health, Michigan Dept. of Health, Lansing, Mich.

February 28, Bituminous Coal Research Inc.: Annual meeting and exhibit, Edgewater Beach Hotel, Chicago. Address: 804 Southern Bldg., Washington 5. Secretary: C. A. Reed.

†March 3-7, American Society for Testing Materials: Spring meeting & committee week. Hotel Statler, Cleveland. Society address: 1916 Race St., Philadelphia. Secretary: C. L. Warwick.

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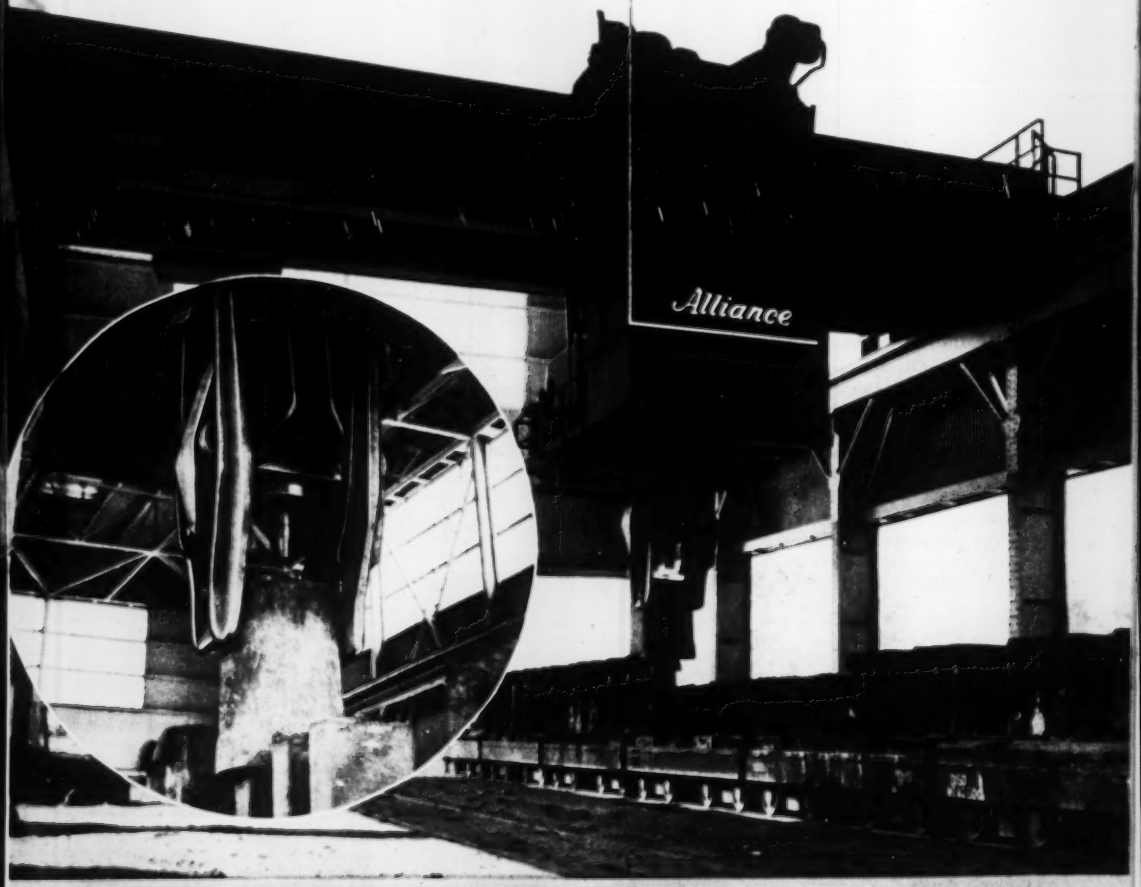

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. . . available as stationary or mounted unit

tor design is symmetrical, four-pole multi-range. Single unit brush rigging holds generator and exciter brushes in neutral position.

Chrysler industrial engine, including a standard battery type ignition, charger and starting motor, powers of the generator. Engine speed is controlled by a constant speed fly-ball governor, operated by a v-belt from separate pulley on the engine crank shaft. Welder is available as a stationary unit or mounted on a pneumatic tired four wheel trailer.

Crane Scale Dial Improved

USE REPLY CARD—CIRCLE No. 2

Use of a dial that indicates weights in both kilograms and pounds simultaneously is announced for its hydraulic crane scale by Hydroway Scales Inc., 20624 W. Eight Mile Rd., Detroit 19, Mich. Availability of this unit, called Hydroscale, should facilitate accurate weighing of materials and products for export-import. Its use is designed to eliminate confusion in use of conversion charts in receiving, processing and shipping.

Company's standard hydraulic mechanism is used. Also provided are tare adjustment for net load indication and optional tilt face dial for level reading. Scale is available with 24 and 30-inch diameter dials and in 5, 10 and 20-ton capacities. Larger capacities can be made on special order.

Portable Three-Speed Reamer

USE REPLY CARD—CIRCLE No. 3

Portable three-speed reamer, the model R, is an addition to the line of heavy duty production finishing tools made by Joseph E. Murphy Co., 24 Ellesworth St., Worcester, Mass. A versatile ma-

. . . standard speeds are 95-120-165 rpm

chine, it can be equipped with a tapping head for use as a high speed horizontal tapping unit. In other applications, uses are found for lapping and honing.

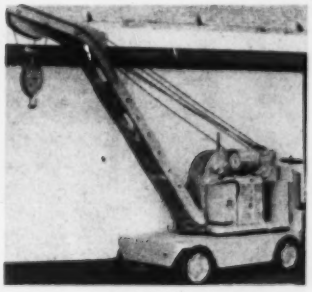
Output speeds of 95-120-165 rpm are standard. Also available are the optional speeds of 48-60-83 rpm, 190-240-330 rpm and 380-480-660 rpm. Speed is controlled through a three-step V pulley, mounted to permit easy changing. Motor is 1/3-hp, 110-120 v, 60-cycle, single phase.

Mobile Crane Moves Bulky Loads

USE REPLY CARD—CIRCLE No. 4

Material difficult to handle by conventional methods and located in areas not serviced by overhead crane can be moved by electric powered mobile crane, called model CZ, made by Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland, O. Recent redesign provides a wider bed and higher operator control pedals for better forward visibility. Crane's capacity is 10,000 pounds at 5½-foot radius.

Telescoping boom makes lengths from 12 to 19 feet available. Three individual motors with solenoid operated brakes are included for powering slew, hoist and boom. Power is supplied by either electric storage battery or gas-electric



. . . for bulky or outdoor handling jobs

unit. Outriggers for increased over-the-side capacity and remote control attachment for boom, hook and slew from the load end are optional.

Surface Finishing Machine

USE REPLY CARD—CIRCLE No. 5

Model 308 surface finishing machine, made by Clair Mfg. Co., 1019 S. Union St., Olean, N. Y., is designed to facilitate surface finishing spoon and fork handles and similarly shaped products. Machine transfers batches of work as units from one holding rack to another between bowl and handle operations. Previously, it was necessary to finish spoon bowls, remove them from racks and place them in tote boxes, then hand finish or reload them in another rack

REPLY CARDS

on page 91 will bring you more information on any new products and equipment in this section.

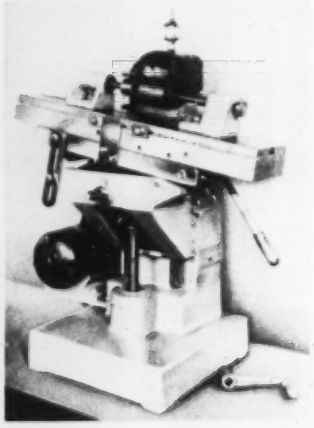
for finishing on another machine.

Operated by 7½ or 10-hp motors, the model has automatic hydraulic in and out stroke, adjustable from ¾-inch to 24 inches. Air circuit provides automatic float or buffs at any predetermined uniform pressure. Included as optional equipment are controls that open rolls and arrest actuation at completion of any predetermined number of strokes from one to 400.

Undercutting Milling Machine

USE REPLY CARD—CIRCLE No. 6

Designed for high speed production application, a compact commutator undercutting milling machine made by Gay-Lee Co., Clawson, Mich., is engineered for



. . . designed for use with carbide tools

use with carbide tools. Machine has a preloaded ball bearing table with tilt provisions to provide better visibilty. Elevating screws are hardened and ground. Among other important features are a heavy rugged cast iron frame, high-speed Parker Majestic spindle and lubrication fittings throughout. Motor is ½-hp with V drive.

Pump Takes Pressures to 275 psi

USE REPLY CARD—CIRCLE No. 7

De Laval Steam Turbine Co., Trenton 2, N. J., offers its IMO A313B pump, designed for a variety of oil handling operations at pressures to 275 psi. Rotary positive displacement pump has three moving parts. Used for high-speed operation, it is pulsation-free and quiet. Capacities to 80 gpm and intermittent pressures to 325 psi are available. Pump handles light or viscous fluids in hydraulic systems, rotary and steam atomizing oil burners, lubrication, governing systems and similar services.

Bender Forms Soft Tubing

USE REPLY CARD—CIRCLE No. 8

Combination tube bender that forms ½ and ⅝-inch OD copper, aluminum, brass or other soft, thin-wall metal tubing is offered by Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill. Bender's dual size shoe and mandrel permit bending two tube sizes without changing parts.

Two-piece construction enables use where one tube ending is connected and simplifies removal from tubing after bend is completed. Bends can be made to 180 degrees, regulated by degree positions calibrated on the unit. Made of steel and aluminum, its overall length is 21 inches; weight is 3 pounds.

Press Unloader is Automatic

USE REPLY CARD—CIRCLE No. 9

Sahlin Engineering Co., Birmingham, Mich., offers a transfer mechanism that indexes, advances and unloads 22-pound brake drums through a 600-ton coining press. Device is designed to cut down danger to the press operator while feeding and unloading. Operator must now place his hand beneath the punch while locating the heavy drum properly in the die. The transfer mechanism can deliver at a maximum rate of 12 per minute.

Unit Is Remote Positioner

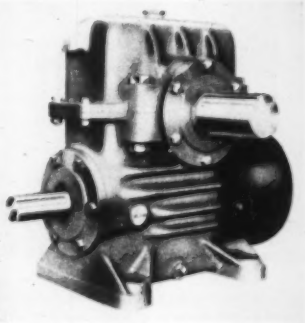
USE REPLY CARD—CIRCLE No. 10

Electronic mechanism, developed by Automatic Temperature Control Co. Inc., Philadelphia 44, Pa., remotely positions a dual pointer, switch cam, pulley wheel or gear train with high accuracy. Called the Atcotran Servo, it employs electrical null-balance differential transformer measuring system actuated by two-phase low inertia motor. Unit has full range rotation in 2, 4, or 10 seconds. It has about 5000 motor driven output shaft positions. Output shaft develops 15 ounce-inch force with 2 second response; 30 ounce-inches with 4 second response and 60 ounce-inches with 10 second response.

Worm Reduction Gear Line

USE REPLY CARD—CIRCLE No. 11

Line of worm reduction gears, called Crofts Radiation speed reducers, is introduced by National Transmission Distributors Inc., 684 Broadway, New York, N. Y. Ratios offered range from 5:1 through 100:1 and from fractional



. . . offers ratios from 5:1 through 100:1

to 400 hp. Smaller units—1⅛, 1¾ and 2¼-inch diameter — feature universal mounting for worm on bottom, top or vertical installation. Legs are removable and can be mated to other holes in housing to permit varied mounting. Ten sizes, ranging from 3½ inches through 14 inches are fan cooled.

Recorders for Testing Units

USE REPLY CARD—CIRCLE No. 12

Two recorders for the company's level-type creep machines and 4000-pound creep relaxation testing machine are announced by Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. Creep specimen deformation of 0.020-inch produces full scale pen carriage movement of 10 inches across a strip chart. Chart is driven at ¼-inch per hour by synchronous motor. A 150-foot chart roll gives a 7200-hour record.

Creep is amplified and transmitted from the extensometer by a Selsyn motor system. Servo motor drives the pen carriage through a flexible shaft and gear reducer. For creep relaxation records, a con-

ventional variable miniature transformer strip chart recorder has been developed. Lowering of stress in a specimen, maintained at constant tensional strain at any temperature to 1800° F, is recorded by a conventional servo system operated as an extensometer on a spring block loading device through which constant strain is maintained.

Cloth Bag Dust Collector

USE REPLY CARD—CIRCLE No. 13

Pangborn Corp., Hagerstown, Md., offers a cloth bag dust collector that provides economical operation through simplified reclaiming mechanism and filter bag design. To satisfy varying dust collection requirements, collector bags are made to range from 5 to 40 feet long.

They contains 1360 to 10,880 sq ft of filter cloth, employ from one to six hoppers and are supplied with structural supports to furnish the type of disposal desired. Bags are fastened by wing-nuts to suspension members, open end down. Nozzles are sealed over grid openings in the collector's floor by hand knob.

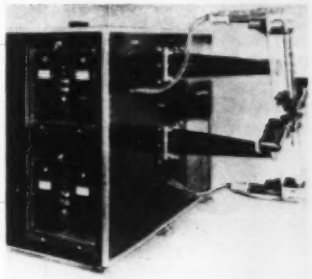
Minimum number of parts, plus easy accessibility provided by walking area between the bags make it possible to maintain and inspect the collector easily and without special tools. Dust lodged in bags is removed by shutting down exhaust and turning on shaker motor. Shaken from bags, it falls through grid openings to hampers, and from there is discharged for reclamation or disposal.

Tin-Plate Thickness, Gage

USE REPLY CARD—CIRCLE No. 14

Improved thickness gage that provides a nondestructive method for checking efficient tin-plate use, is made by Research & Control Instruments Division, North American Phillips Co. Inc., 750 S. Fulton Ave., Mt. Vernon, N. Y. In operation, an x-ray beam is directed upon test sheet's surface. Through proper kilovolt control, tin-plate is penetrated and beam strikes the underlying steel. Rays emitted are measured by Geiger counters and intensity expressed as a logarithmic function of tin plate thickness on a printing register.

Printer automatically resets electronic circuits for the next measurements. All counting stages and relays are separate plug-in assemblies and electronic chassis slide



. . . x-ray beam penetrates tin plating

in and out for convenient servicing. Gage is rated 6 kva and handles tin coatings from 0 to 150 microinches thick. It is available as a single or double unit to measure thickness on one or both sides of steel plate.

Tractor Is Warehouse Handler

USE REPLY CARD—CIRCLE No. 15

Stand-up drive Load-Mobile tractor is made by Market Forge Co., Everett 49, Mass., for warehouse use where items are stored on either skids or pallets. Platform is 7 inches above the floor

. . . hauls loads to 10,000 pounds at 3 mph

to avoid unnecessary exertion in getting on and off to unload. Use of the same pedal for forward and reverse movement eases operation. Reversing is controlled by separate selector switch. Tractor hauls loads to 10,000 pounds at about 3 mph.

Tractor has the company's standard power drive, equipped with a 340 amp-hour battery. Drive wheel is 10½ inches diameter, with 7-inch face. Rear wheels are 7 inches diameter, with 5-inch face.

Purifier Removes Entrainment

USE REPLY CARD—CIRCLE No. 16

V. D. Anderson Co., 1935 W. 96th St., Cleveland 2, O., offers an addition to its series of Hi-eF purifiers for installation on compressed air, gas, vapor and steam lines. Primary application of this line-type purifier is removing guck and entrained solids from exhaust steam installations; removing condensate from compressed air lines; delivering clean, dry steam for food processing; preventing process gas and air lines from becoming contaminated with line scale and liquids; and removing entrainment from vapor lines following evaporations.

Ability to remove 99 per cent of all entrainment is attributed to the unit. Centrifugal element within the purifier gives entrainment laden vapor a rapid rotational motion. This causes heavier entrainment to be thrown outward to walls where it is drained down and ejected. Unit has no moving parts; employs self-cleaning action that reduces maintenance needs.

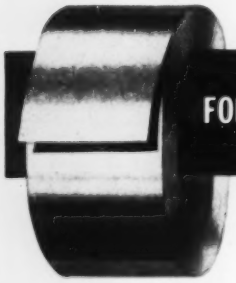
Dark Field Microscopes

USE REPLY CARD—CIRCLE No. 17

Improved illuminating system is offered in dark field microscopes made by American Optical Co., Southbridge, Mass. Either monocular or binocular instruments can be selected. Both have hinged substages that open to facilitate cleaning. Interchange of slides is accomplished without disturbing stage settings through the company's pinchgrip mechanical stage. Precise control over the degree of firmness in the coarse focusing mechanism is gained by a mechanical refinement called adjustable tension. In focusing, a constant ratio lever insures accuracy of the two-micron scale throughout the entire focusing range.

Microscope makes specimens luminous and visible by a cone of light striking from all sides at an angle to avoid entering the objec-

typewriters tables & time-saving



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is custom-made steel suitable for innumerable products. It offers many time-saving advantages, too. It's a productioneer's tool—providing a continuous supply of uniform steel from coils to your automatics, regardless of forming operations involved.

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1475

tive. Light source is centerable in relation to condenser optics and the condenser is quickly adjustable for slide thickness from 1.15 to 1.25 mm.

Semiautomatic Contour Welding

USE REPLY CARD—CIRCLE No. 18

Contour welds formerly made with manual equipment can be made semiautomatically with the HWM-1 welder developed by Linde Air Products Co., division of Union Carbide & Carbon Corp., 30 E. 42 St., New York 17, N. Y. Welder

. . . adds uniform speed to flexibility

retains flexibility of manual operation, adding such mechanized advantages as uniformity of speed, arc length and weld deposit. High quality welds can be made in sheet metal assemblies at speeds to 100 inches per minute.

Torch uses filler rod that is fed automatically by electrically-powered drive rolls through a flexible conduit into tungsten arc. Driven filler rod provides a propelling force that moves the torch when rod is kept in contact with the work. Operator starts the rod feeding, then steers the moving torch. It welds plain carbon and stainless steel in the thickness range of 0.020 to 0.125-inch.

Press Pierces Large Parts

USE REPLY CARD—CIRCLE No. 19

Holes are pierced in large parts, particularly where quantity requirements are limited, by an automatic electric piercing press available from Dayton Rogers Mfg. Co., 2824 13th Ave. South, Minneapolis 7, Minn. Machine leaves operator free to handle

Here's Where *You* Come In!

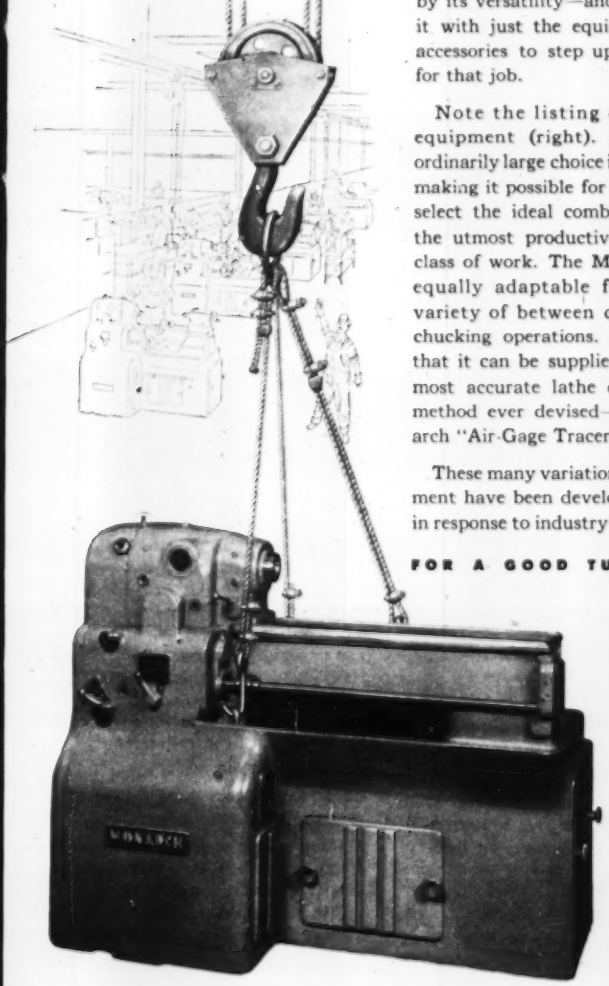
That's right—from here on you can just about write your own ticket! Think of the most exacting assignment for small lathes anywhere along your production lines. Then tell us about it. We'll deliver a high-speed, sensitive Monarch 10" Model EE—a lathe with an inbuilt productivity matched only by its versatility—and you'll get it with just the equipment and accessories to step up standards for that job.

Note the listing of typical equipment (right). An extraordinarily large choice is available, making it possible for the user to select the ideal combination for the utmost productivity on *his* class of work. The Model EE is equally adaptable for a wide variety of between center and chucking operations. Note, too, that it can be supplied with the most accurate lathe duplicating method ever devised—the Monarch "Air-Gage Tracer."

These many variations in equipment have been developed solely in response to industry's demands that we make the basic Model EE design available for constantly widening uses. Could anything we say speak better for its design and specifications? Some place—*many* places, perhaps—this outstanding Monarch lathe can improve your production at lower cost. Send the coupon today for full details . . . . . *The Monarch Machine Tool Company, Sidney, Ohio.*

TYPICAL EQUIPMENT

- "Air-Gage Tracer"
- Steady rest
- Follow rest
- Taper turning attachment
- Collet attachments
- Air equipment
- Bar feed attachments
- Collet chucks
- Jaw chucks
- Step chucks
- Stops
- Micro-gaging diameter dial
- Hexagon power feed bed turret
- Hand operated cut-off slide
- Variable feed control
- Ball turning rest



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Monarch
ACCURACY • ECONOMY • LONG LIFE
TURNING MACHINES

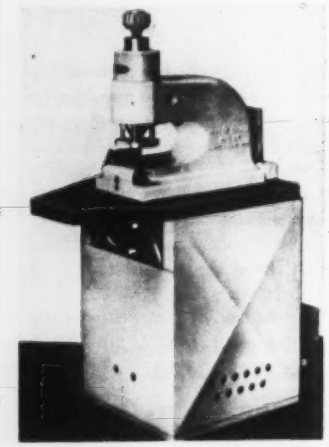
THE MONARCH MACHINE TOOL CO., Sidney, Ohio

Gentlemen:
Please send me without obligation your Booklet No. 1003 covering the Monarch Precision Manufacturing Lathe—Model EE. *(It's that new one with 28 pages and a host of those sparkling Monarch illustrations.)*

NAME _____
COMPANY _____ TITLE _____
ADDRESS _____
CITY _____ ZONE ____ STATE _____

large parts by requiring no hand or foot levers for tripping. Two contacts on a magnetic stripper plate replace conventional levers in putting it in operation.

Press is capable of piercing holes a maximum $\frac{1}{2}$-inch diameter in materials to 3/16-thick. Ram is located in machine's bed, permitting punches to be mounted upstairs for easier location of pierced holes. It will receive a standard Allied punch and die and has nonrepeat mechanism. Machine is mounted on casters to simplify relocating.



. . . absence of levers leaves operator free

Automatic Steam Generator

USE REPLY CARD—CIRCLE No. 20

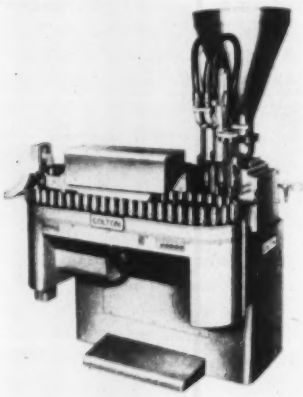
Fully automatic self-contained Continental packaged steam generator is announced by Boiler Engineering & Supply Co., Phoenixville, Pa. Generator is available for use with heavy or light oil, gas or a combination, and is made in sizes from 10 to 500 hp for 15 to 200 pounds operating pressures. One of the boiler's important features is that front and back can be opened in 15 to 20 minutes, providing ready access for interior cleaning and servicing.

Efficiency is guaranteed at a minimum 80 per cent and steam moisture content under 1 per cent. Burner's operation can be modulated from 35 to 125 per cent to provide periodic over-surge when needed. To assure maximum heat transfer and low flue gas temperature, all fuel is burned in the water-surrounded boiler furnace. The company's rotary firing technique is used to gain maximum heat transfer.

Automatic Tube Filler, Closer

USE REPLY CARD—CIRCLE No. 21

Addition of the No. 180 automatic tube filler and closer to its line of tube filling equipment is announced by Arthur Colton Co., 3401 E. Lafayette Ave., Detroit 7, Mich. Made for handling tube to $1\frac{1}{4}$-inch diameter in twin filling and $1\frac{3}{4}$-inch diameter in single filling, the machine becomes a companion unit to the company's model 175, developed previously.



. . . in twin filling, 85 tubes per minute

Single and twin filling units are available as standard in both models. Capacity of the No. 180 single is 55 tubes per minute, in sizes from $\frac{1}{2}$ to $1\frac{3}{4}$-inch diameter and $7\frac{1}{2}$ inches long. The twin filler handles 85 tubes per minute in sizes to $1\frac{1}{4}$-inch diameter and 7 inches long. Machines are powered by a $1\frac{1}{2}$-hp motor.

Motor Condenser Remounted

USE REPLY CARD—CIRCLE No. 22

Condensers are removed from exterior surface and housed within the mounting base on integral horsepower, capacitor start motors made by Kingston-Conley Division, Hoover Co., 70 Brook Ave., N. Plainfield, N. J. In addition to improving motor appearance, resulting compact arrangement should eliminate height problems on applications where mounting space is critical. Condensors will also get greater protection from handling damage in transit. Motors range from $\frac{3}{4}$-hp, 1140 rpm to 3 hp, 3450 rpm. They are equipped with heavy-duty ball bearings and are suitable for continuous operation on general purpose applications.

Controls Liquid, Gas Flow

USE REPLY CARD—CIRCLE No. 23

Liquid or gas flows may be controlled by the Mite purge meter coupled with a Conoflow H-11 constant differential relay. Made by Brooks Rotameter Co., Lansdale, Pa., assembly is designed to maintain a constant predetermined flow rate regardless of variations in either upstream or downstream pressure.

Mandrel Expands Like Collet

USE REPLY CARD—CIRCLE No. 24

To simplify holding of workpieces during machining operations, a one-piece mandrel is offered by E. Westberg Co., E. Syracuse, N. Y. The Colletmandrel is slotted to form three cantilever sections that deflect to positively engage the workpiece. It has one or more gripping shoulders, each size having a range of more than 1/32-inch.

Resistance Thermometer Line

USE REPLY CARD—CIRCLE No. 25

Designed for accurate indication and control of temperatures ranging from minus 100° F to plus 300° F, a line of resistance thermometers is offered by General Electric Co.'s Meter & Instrument Department, Schenectady 5, N. Y. They are available in three basic types: HP-11 resistance thermometer indicator, HP-12 two-position controller or protector and HP-14 three-position controller.

Boron Carbide Lapping Agent

USE REPLY CARD—CIRCLE No. 26

Robert Marks Co., Providence, R. I., offers a boron carbide lapping compound for use on both metallic and nonmetallic materials. Carrier for the abrasive is soluble in kerosene and other petroleum

products, vegetable and animal oils. Grit sizes available are: 100, 150, 220, 280, 320, 400, 500, 600, 800.

Multipurpose Locating Device

USE REPLY CARD—CIRCLE No. 27

With Speedi-Spacer, a multiposition locating device, announced by Queen City Machine Tool Co., Cincinnati 2, O., any upright drill or radial drill with an accurate spindle becomes a jig boring tool. Positive positioning is provided by nine longitudinal and nine transverse positioning stop screws.

Capacitor for Filtering Leads

USE REPLY CARD—CIRCLE No. 28

Type 503C, small feed-through ceramic capacitor for filtering leads passing through a chassis, is offered by Sprague Electric Co., N. Adams, Mass. Through-lead passes through a hole in the center of a dielectric disk. For protection against humidity the disk element is resin sealed in a recessed cup at the top of the metal ferrule.

Nonbinding Flask Pin

USE REPLY CARD—CIRCLE No. 29

Nonbinding flask pin, developed by Martin Engineering Co., Kewanee, Ill., eliminates the necessity for excessive tolerances ordinarily allowed and decreases scrap caused by mismatching. The pin will not seize or bind when cope is lifted from drag. Its flexibility also cuts breakage of pins.

Insulating Varnish

USE REPLY CARD—CIRCLE No. 30

Insul-Film, an insulating varnish with the advantages of the silicones, was developed by Electrofilm Corp., N. Hollywood, Calif. It has a flexible baking cycle, 300 to 400° F for approximately 1 hour and can be applied spraying, brushing or dipping.

Elongates Holes in Tooling

USE REPLY CARD—CIRCLE No. 31

A drill bushing for elongating holes in tooling and for drilling slotted holes is available from Texas Engineering & Mfg. Co. Inc., Dallas, Tex. It consists of a half round bushing that attaches to the drill and forces it over in the di-

Pretty smooth grinding these days, Jim!

SIMONDS ABRASIVE CO.

Grinding Wheels

It's inspection OK's instead of KO's since Simonds Abrasive Company wheels were put to work in the grinding room. Why? Because Simonds wheels are accurately specified to give top results on the jobs they have to do. They're part of a complete line containing everything to smooth your way to real production efficiency . . . grinding wheels, mounted wheels and points, segments and abrasive grain . . . all made under complete quality control by Simonds Abrasive Company, a major manufacturer of grinding wheels for almost 60 years. Write for data book and name of your distributor.

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Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

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"FULL-SCALE" Accuracy Means Precision Measuring

The scale on the dial of *this* air gage is accurately calibrated to .00005" throughout its entire 7½" length and, unlike the scales on most other air gages, the graduations actually tell the truth . . . the whole truth — not only over certain parts of the scale but from one end of the scale to the other. With the Federal Dimensionair you can rely on the accuracy of readings *anywhere* on the scale and work to close limits within a wide tolerance zone.

The Federal Dimensionair has many other important features: The long operating range of .003" with 2500 to 1 magnification provides clearance for exploring irregularly shaped or tapered holes and permits the *same* plug to be used on *both* rough and finished dimension. This clearance also means longer plug wear. The Dimensionair is easily set with only *one* master due to the accuracy of our scale and it remains stable for long periods.

Ask our nearest representative to show you this air gage which sets new standards in better, more positive air gaging, or write to us for complete information and prices. Federal Products Corporation, 1211 Eddy Street, Providence 1, Rhode Island.

FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing all types of DIMENSIONAL INDICATING GAGES.

rection required. The bushing is made of tool steel and can be made for whatever size hole is desired.

Cuts All Metals

USE REPLY CARD—CIRCLE No. 32

Arcair Co., Bremerton, Wash., introduces a gouging and cutting torch that operates on an ordinary direct current welding machine and a compressed air line. It removes defects in castings or forgings, cleans root of welds, removes welds and grooves, cuts or bevels mild steel, stainless steel, hard alloys, brass, bronze, monel, cast iron, etc.

Electrical Grinder Miller

USE REPLY CARD—CIRCLE No. 33

Super 40, a multipurpose electrically powered grinder-miller is available from Precise Products Co., Racine 1, Wis. It is built for high speed applications when set up in the company's machine tool mounts on standard machine tools or when used as a portable hand tool with or without the attachable Coolflex flexible shaft.

Light for Inspection

USE REPLY CARD—CIRCLE No. 34

Model 215 fluorescent light, announced by Larrimore Sales Co., St. Louis 1, Mo., is designed primarily for use in inspection, assembly and maintenance. It features a fully adjustable bracket, two full sized 1½-inch diameter, 15 w fluorescent tubes and standard fluorescent starters.

Electrode for Cast Iron

USE REPLY CARD—CIRCLE No. 35

EutecTrode 27, a nickel-free electrode for cast iron, is available from Eutectic Welding Alloys Corp., Flushing, N. Y. While it does not replace nickel-bearing electrodes on all applications, it offers extremely high tensile weld with a uniform amount of carbon

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

Helpful Literature

76. Welding Alloys

Eutectic Welding Alloys Corp.—16-page illustrated "1952 Directory" of electrodes and welding alloys contains performance and application data on series of Eutectic Low Temperature Welding Alloys for use on cast iron, steel, alloy steels, copper, bronze, aluminum, magnesium, hard and machinable overlays and for cutting all metals.

77. Package Barriers

Reynolds Metals Co.—Actual samples, prices and complete physical data are included in loose-leaf bulletin "Reynolds Barrier Materials" which covers types to meet the requirements of military packaging. Flexible foil laminated materials of heat sealing type are usable for bags and other forms of packages and nonheat sealing types for grade A and other wrapping applications.

78. Disk Grinders

Besly-Welles Corp.—You'll find the full line of Besly-Bowen radial head face grinders cataloged in this illustrated company publication. Available in three basic models, grinders use abrasive wheels in diameters of 6 to 18 in. and perform variety of operations through use of rotary tables, multiple-station indexing tables, magnetic chucks, rotary fixtures and stationary clamps.

79. Underdrive Presses

Danly Machine Specialties, Inc.—12-page illustrated brochure entitled "Underdrive Presses" is descriptive of single, double and triple action presses having 400-ton capacity and over. Presses feature placement of clutch brake and other major drive components on level below actual working area to allow maintenance and servicing without interrupting production.

80. Heat Machines

Fageol Heat Machine Co.—Principle of spraying heated air out at floor level to form blanket of warm air is explained in 6-page illustrated bulletin L-4782. Models PW-140 (140,000 Btu unvented portable) and VO-160 (160,000 Btu, vent optional) are shown along with dimensions and specifications. Applications include office and factory use, heating construction machinery, drying concrete and heating warehouses.

81. Dust Collectors

American Wheelabrator & Equipment Corp.—32-page illustrated catalog 72-B "Dust and Fume Control" covers various sizes and models of Dustube cloth tube type dust collectors and advantages to be gained from cloth filtration. Air flow capacities range upward from 252 cfm, and units filter through various kinds of cloth, depending upon application.

82. Industrial Truck Chargers

Motor Generator Corp.—Line of Hobart automatic motor generator chargers for industrial trucks is described in 6-page illustrated folder J-4594. Principles and theories of operation of sets are explained for charging all types of Edison and lead batteries.

83. Process Machinery Line

Hardinge Co.—Complete line of process machinery for mining, chemical, stone, ceramics, mineral, paper, water, industrial wastes and sewage applications is described in 8-page illustrated bulletin No. 100-A. Bulletin is divided into sections of actual process operations.

84. Contact Controllers

Minneapolis-Honeywell Regulator Co., Brown Instruments Div.—16-page catalog 8000 contains illustrations and descriptions of vane type electric contact control units used with Electr-O-Vane thermometers and pressure gages and ElectroniK potentiometer. They give snap action on-off, two or three-position control.

85. Regulating Valves

Spence Engineering Co.—A large cutaway illustration of typical pilot-operated regulating valve with detailed explanations of its five design features is presented in 4-page bulletin 700. In addition, panel shows how control function of regulator can be changed by using different sensitive pilot.

86. Gears, Speed Reducers

Philadelphia Gear Works, Inc.—"Power-Thrifty Products by Phillie Gear" is title of 4-page bulletin that offers readers descriptive and illustrative information on line of gears, speed reducers, flexible couplings and Limi-Torque valve controls. Types and size ranges are given.

87. Water Systems Counsel

Pittsburgh Pipe Cleaner Co., Construction & Engineering Div.—"The Pittsburgh Service for Water and Waste Water Systems" is title of 4-page folder which outlines briefly the service, counsel and engineering skill offered to aid you in getting highest efficiency from your water systems.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

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88. Welding Rod & Wire Chart

Ampco Metal, Inc.—Included on wall chart of Ampco bronze welding rod and wire products are data on trade name, AWS-ASTM designation, descriptive information, typical applications, mechanical properties, deposit chemical composition, recommended current and polarity, NEMA color markings and diameter sizes.

89. Copper & Alloy Rods

American Brass Co.—Physical constants and properties on 46 free-cutting and general purpose copper and copper alloy rods for screw machine use are included in 24-page illustrated publication B-14. Chart for balancing material costs against production costs is also featured, as are weight tables and conversion factors.

90. Die Lifter & Drum Stand

Economy Engineering Co.—One side of 2-page illustrated bulletin presents general information and specifications for 500-lb capacity Shoplifter for handling heavy dies and shop fixtures, among other jobs. Other side describes Red Rocker drum stand which eliminates lifting when placing drum in position to drain.

91. Wheel Forming Attachment

Niles-Bement-Pond Co., Pratt & Whitney Div.—Forming and re-truing of complex forms on grinding wheels can be done quickly with Diaform wheel forming attachment pictured and described in 8-page circular No. 543. Attachment is designed for use on conventional horizontal spindle surface grinders, tool and cutter grinders and universal and tool grinding machines.

92. Refractories

Ramtite Co. — 24-page illustrated catalog and data book "Boiler Settings with Plastic and Castable Refractories" contains cross-sectional drawings, charts and other data. Information on refractory manufacture, design and installation also is included.

93. Switch Locomotive

General Electric Co. — Six-motor 1600-hp heavy duty all-purpose locomotive described in 4-page illustrated bulletin GEA-5609 has ample pulling power for transfer and hump service, as well as ore, coal and very heavy freight hauling. Performance data and specifications are included.

94. Spring Coiler

Connors & Davis Sales Corp.—Any type torsion, compression, extension, tapered or special spring can be made on Perkins coiler described and illustrated in company data sheet. It will form springs of any diameter from 5/32 to 12 in. and larger, from wire size 0.005 to 0.125. Spring diameter can be changed while it is being coiled.

95. Pyrometers, Thermometers

Minneapolis-Honeywell Regulator Co., Brown Instruments Div.—Wiring diagrams and circuit information of pyrometer, resistance thermometer, tachometer and other actuations is included in 8-page illustrated bulletin 1051 which describes line of noncontrol pyrometers and resistance thermometers.

96. Fuses, Lubricating Devices

Trico Fuse Mfg. Co.—Quick reference folder, series F.L.B. 300-C, briefly describes merits of powder-packed renewable, One-Time and plug fuses; fuse pullers; Kliplok Clamps for fuse clips; test clamps; and lubricating devices. Lubricating devices are segregated into handy wall chart showing types and sizes, with selection and application suggestions.

97. High Frequency Insulators

American Lava Corp. — JAN-1-8 numbers cross indexed with company numbers on AlSiMag high frequency insulators are found in 24-page illustrated bulletin 512. Insulators are illustrated and line drawings and dimensions are shown. Mechanical and electrical properties are detailed.

98. Arc Furnace Equipment

Westinghouse Electric Corp.—20-page illustrated booklet B-4696 discusses application of electrical equipment to both direct and submerged arc furnace for applications in steel mills, chemical plants, foundries and nonferrous metal refineries. The Optimelt furnace control, circuit breakers, transformers, furnace regulators and control panels are covered.

99. Grinders, Buffers

Hammond Machinery Builders, Inc. —Line of abrasive belt and wheel grinding, polishing and buffing machinery is subject of 20-page illustrated catalog No. 75. Bench and floor type wheel grinders, polishing lathes and backstands of various size are among machines covered. Needed accessories for buffing and polishing operations are featured as well.

100. General-Purpose Pumps

Allis-Chalmers Mfg. Co.—Type 88B grease-lubricated pedestal-mounted general-purpose pumps are illustrated and their construction details are brought out in bulletin 52B6351B. Capacities to 2500 gpm at heads to 550 ft are available with stuffing box or mechanical seal, direct coupling or V-belt drive and choice of materials.

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in the deposit so that deposited material is similar to a high tensile, high carbon steel.

Three-Wire Relay

USE REPLY CARD—CIRCLE No. 36

Model EM-10 mercury plunger relay for three-wire operation is announced by Ebert Electronics Co., Hollis, Long Island, N. Y. It has wide applications for lock-up relay service, off-on pushbutton control, etc. When contact is made the input line connects to two isolated circuits.

Phosphatizes Steel and Iron

USE REPLY CARD—CIRCLE No. 37

Keykote, a powdered material developed to phosphatize steel and iron at low concentrations, is available from Kelite Products Inc., Chicago 45, Ill. It operates in pH range as low as 3 and may be applied by spray or immersion. Stainless steel equipment is not required when material is used. It will not sludge out and no screen is necessary in immersion tanks.

Driver with Removable Bits

USE REPLY CARD—CIRCLE No. 38

Hy-Pro Phillips adapter hand drivers and holders, offered by Continental Screw Co., New Bedford, Mass., have removable insert bits. There are four different size bits, but No. 2 size will drive from 75 to 80 per cent of all screws with Phillips recessed type heads.

Slag Resistant Brick

USE REPLY CARD—CIRCLE No. 39

Graftex, a clay-graphite refractory brick introduced by North American Refractories Co., Cleveland 14, O., is a prefired product that has the ability of shedding slag, preventing rapid deterioration of the refractory. Brick are available in 9-inch straights and most standard 9-inch series brick.

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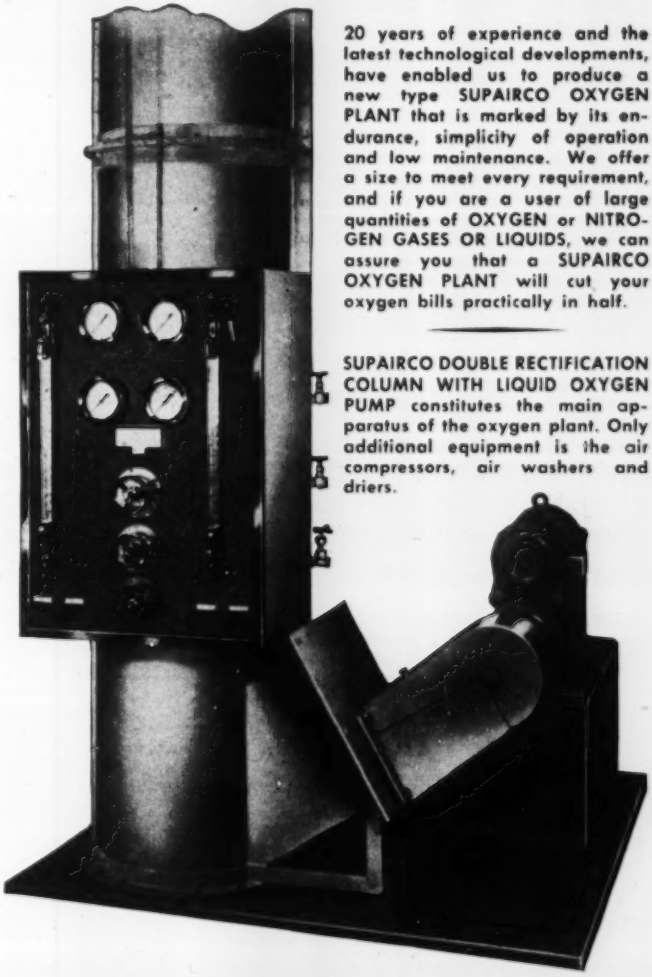

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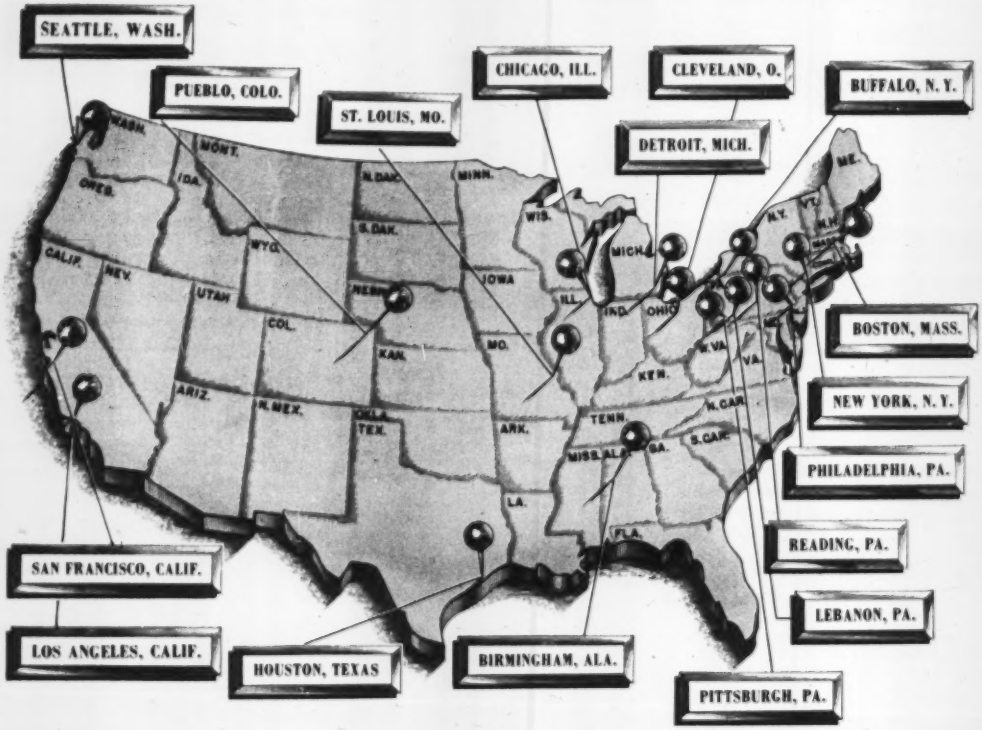

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

The Market Outlook

A NOTE of caution is evident in the steel markets as signs multiply of easing supply conditions in some products, notably the light flat-rolled items and specialties. Buying is less frenzied at both mill and warehouse levels and distributors' stocks of some products are reported accumulating. Consumers are shying away from premium-priced material. The mills are having difficulty moving seconds and rejects. All these may point to an easier supply much sooner than had been predicted or expected. But don't look for a balance in overall steel supply and demand immediately. There's still an excess of demand over supply.

DEMAND— Mills anticipate full bookings for the second quarter, but the rate at which they fill will be slower than in 1951. Cold-rolled sheets and strip continue to ease in supply. Certain specialties also are easier. These include low silicon steels, straight chrome alloys and tool steels. On the other side, galvanized sheets continue in tight supply and many producers are weeks behind on commitments. Even here, an eastern mill believes it will have more galvanized sheets by March as result of an expected improvement in zinc supply. Demand for large carbon bars is extremely heavy and there are no signs of easing. New ammunition programs will require greater tonnages of cold finished bars. Heavy plates are acutely tight but supplies of light plates are steadily improving as more tonnage is made available from continuous sheet mills. A new ship program now shaping up likely will add up to plate supply difficulties over coming months. Structural steel continues tight but some authorities think there will be noticeable improvement in 90 days.

WHY— Civilian durable goods manufacturing curtailments under government fiat account for much of the slackening in demand being experienced for some products. This is borne out by rising unemployment in the automotive centers where steel supply conditions are noticeably easier because of the cutbacks in auto production. Substantial part of the easing in supply is due to government restrictions on manufacture of civilian goods.

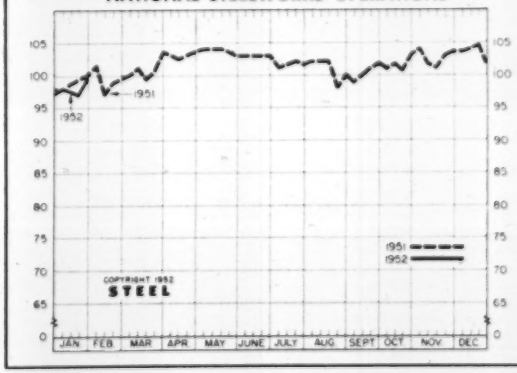
OUTLOOK— Viewing the steel supply picture broadly, it appears easier conditions are directly attributable to more efficient functioning of the Controlled Materials Plan. Fewer CMP tickets are being issued, assuring recipients of having their authorizations honored by the mills. Under more efficient CMP administration, steel is being channeled increasingly into those avenues of consumption desired by the government. More semifinished steel is being directed to production of steel products in tightest supply, such as bars, plates, shapes, as requirements for other items, sheets, strip and specialities, shrink. This closer adjustment of demand to supply conceivably could bring about lifting of certain governmental restrictions on use of steel should surplus stocks threaten.

ANOTHER ANGLE— From still another angle, full impact of the defense program on steel supply over the remainder of this year remains to be determined. The Senate Small Business Committee thinks steel will be tight through this year Most observers have been predicting progressively easier conditions beginning no later than midyear. Confirming the Small Business Committee's report, a committee of 35 composed of representatives of steel and other metal-producing companies, in a report to the Office of Defense Mobilization state defense requirements for steel will far outrun any increase in steel output this year.

PRODUCTION— Operating rate of the steel industry rose 2.5 points last week to 99.5 per cent of capacity. This rate is based on the new industry capacity figure of 108,587,670 net tons as of Jan. 1.

PRICES— Stability continues to mark the iron and steel markets pricewise. New price regulation covering industrial fasteners will not materially affect price and discount schedules in effect since last January. Little changes are reported in warehouse prices due to mid-month cost calculations under the OPS ceiling price order.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Jan. 26	Change	Same Week 1951	Same Week 1950
Pittsburgh	98	0*	98.5	93.5
Chicago	105	+ 2*	102	98
Mid-Atlantic	99	— 2	99.5	86
Youngstown	105	— 1	106	100
Wheeling	100.5	0	98.5	100
Cleveland	98.5	— 4.5	103.5	93.5
Buffalo	104	0	104	95.5
Birmingham	104	0	100	100
New England	83	— 2	92	80
Cincinnati	101	— 2	106	103
St. Louis	81.5	+ 5.5	88	87
Detroit	106	+ 3*	107.5	106
Western	104	+ 7	105	89
Estimated national rate	99.5	+ 2.5	100	94

Based on weekly steelmaking capacity of 2,082,617 tons in 1952; 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950.

*Change from revised rate for preceding week.

The Metalworking Outlook—p. 27 Production-Engineering News—p. 63

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Jan. 24 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av. =100)	171.92†	171.92†	171.92	171.92	114.90
Index in cents per lb.	4.657†	4.657†	4.657	4.657	3.194

ARITHMETICAL PRICE COMPOSITES:

Finished Steel, NT	$106.32†	$106.32†	$106.32	$106.32	$69.82
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	52.54	30.17
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	29.56
Malleable Pig Iron, GT	53.27	53.27	53.27	53.27	30.79
Steelmaking Scrap, GT	43.00	43.00	43.00	46.33	31.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

† Preliminary.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Jan. 24 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	4.18	2.98
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.65	2.50
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.50
Shapes, del. Philadelphia	3.918	3.918	3.918	3.90	2.64
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.65
Plates, Chicago	3.70	3.70	3.70	3.70	2.65
Plates, Coatesville, Pa.	4.15	4.15	4.15	4.15	2.65
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.65
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.65
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.60-75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.55	3.335
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.50
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.35	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.90	3.30
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.85-5.60	3.335
Wire, Bale, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.425
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.90-6.20	4.125
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$8.70	$5.75

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$66.00	$50.00
Wire rods, $\frac{7}{32}$-$\frac{9}{32}$", Pitts.	4.10-30	4.10-30	4.10-30	4.10-30	2.675

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$31.00
Basic, Valley	52.00	52.00	52.00	52.00	30.00
Basic, del. Phila.	56.61	56.61	56.61	56.39	32.01
No. 2 Fdry., Pitts.	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Chicago	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Valley	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Del. Phila.	57.11	57.11	57.11	56.89	32.51
No. 2 Fdry., Birm.	48.88	48.88	48.88	48.88	26.88
No. 2 Fdry. (Birm.) del. Cin.	55.49	55.49	55.49	55.58	31.75
Malleable, Valley	52.50	52.50	52.50	52.50	30.50
Malleable, Chicago	52.50	52.50	52.50	52.50	30.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	37.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.00*

* F.o.b., Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt., Pitts.	$44.00	$44.00	$44.00	$46.50	$22.50
No. 1 Heavy Melt., E. Pa.	42.50	42.50	42.50	47.50	31.00
No. 1 Heavy Melt., Chicago	42.50	42.50	42.50	45.00	30.00
No. 1 Heavy Melt., Valley	44.00	44.00	44.00	46.25	32.50
No. 1 Heavy Melt., Cleve.	43.00	43.00	43.00	45.75	31.25
No. 1 Heavy Melt., Buffalo	43.00	43.00	43.00	51.50	33.00
Rails, Rerolling, Chicago	52.50	52.50	52.50	67.00	38.50
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	62.00	42.50

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn., Connlsvl.	$14.75	$14.75	$14.75	$14.75	$8.75-$9
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	17.50	9.75-10.00
Oven, Fdry., Chicago	23.00	23.00	23.00	21.00	15.10

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	19.50
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.80	18.80	18.80	16.80	12.80-85
Tin, New York	121.50	103.00	103.00	185.00	70.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	50.00	50.00	50.00	32.00	28.25
Nickel, refinery, duty paid	56.50	56.50	56.50	56.50	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88	55.38	55.88	....
Syracuse, N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill., Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	57.50	58.00	....
Fontana, Calif. K1	58.00	58.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del.	60.16	60.66	....	....
Granite City, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah C11	52.00	52.50	....	....
Geneva, Utah C11	52.00	52.50	....	....
LoneStar, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N. & S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKees Rocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Sweedeland, Pa. A3	54.00	54.50	55.00	55.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos. southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P.)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry., frt. allowed K2	92.50
Keokuk, Ill. & Fdry., 12½ lb pigiets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia, delivered	63.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Jan. 24, 1952; cents per pound except as otherwise noted. Code numbers following mill points indicate producing company; key on next two pages

Changes shown in Italics.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 ....52.00

INGOTS, Alloy (NT)
Detroit R7 ....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 ....82.00
Midland,Pa. C18 ....54.00
Munhall,Pa. U5 ....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 ....56.00
Ensley,Ala. T2 ....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 ....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y., B2 ....56.00
Munhall,Pa. U5 ....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ....56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 ....66.00
Canton,O. R2 ....66.00
Clairton,Pa. U5 ....66.00
Cleveland R2 ....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 ....69.00
Ensley,Ala. T2 ....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 ....66.00
Geneva,Utah C11 ....66.00
Houston,Tex. S5 ....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y., B2 ..66.00
LosAngeles B3 ....85.00
Munhall,Pa. U5 ....66.00
Seattle B3 ....85.00
So.Chicago R2,U5,W14 ..66.00
So.Duquesne,Pa. U5 ....66.00
So.SanFrancisco B3 ....85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 ....70.00
Canton,O. R2 ....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 ....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 ....70.00
Houston,Tex. S5 ....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 ....90.00
Massillon,O. R2 ....70.00
Midland,Pa. C18 ....70.00
Munhall,Pa. U5 ....70.00
So.Chicago R2,U5,W14 ..70.00
So.Duquesne,Pa. U5 ..70.00
Struthers,O. Y1 ....70.00
Warren,O. C17 ....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ....$82.00
Cleveland R2 ....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 ....82.00
Massillon,O. R2 ....82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ....82.00

SHEET BARS (NT)
Fontana,Calif. K1 ..$89.00

SKELP
Aliquippa,Pa. J5 ....$3.45
Munhall,Pa. U5 ....3.35
Warren,O. R2 ....3.35
Youngstown R2, U5 ....3.35

WIRE RODS
Alton,Ill. L1 ....4.40
AlabamaCity,Ala. R2 ....4.10
Buffalo W12 ....4.10
Cleveland A7 ....4.10
Donora,Pa. A7 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 ....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 ....4.10
Los Angeles B3 ....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 ....4.30
No.Tonawanda,N.Y. B11 ..4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 ....4.20
So.Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1), N15 ....4.10
Struthers,O. Y1 ....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 ....4.45
So.Chicago,Ill. U5 ....4.45

STRUCTURALS
Carbon Std Stond. Shapes
AlabamaCity,Ala. R2 ....3.60
Aliquippa,Pa. J5 ....3.65
Bessemer,Ala. T2 ....3.65
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fairfield,Ala. T2 ....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 ....3.65
Geneva,Utah C11 ....3.65
Houston,Tex. S5 ....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 ....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....5.90
Portland,Oreg. O4 ....4.50
Seattle B3 ....4.30
So.Chicago,Ill. U5, W14 ..3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stond. Shapes
Clairton,Pa. U5 ....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 ....4.35
So.Chicago,Ill. U5 ....4.35

H.S., L.A. Stond. Shapes
Aliquippa,Pa. J5 ....5.50
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.10
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y-1 ....6.00
Johnstown,Pa. B2 ....5.50
Lackawanna,N.Y.(14) B2 5.50
LosAngeles B3 ....6.05
Munhall,Pa. U5 ....5.50
Seattle B3 ....6.10
So.Chicago,Ill. U5 ....5.50
SoSanFrancisco B3 ....6.00
Struthers,O. Y1 ....6.00

Wide Flange
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fontana,Calif. K1 ....4.65
Lackawanna,N.Y. B2 ....3.70
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....5.50
Lackawanna,N.Y. B2 ....5.50
Munhall,Pa. U5 ....5.45
So.Chicago,Ill. U5 ....5.45

BEARING PILES
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.65
Bessemer,Ala. T2 ....5.65
Clairton,Pa. U5 ....5.65
Cleveland J5, R2 ....5.65
Conshohocken,Pa. A3 ..5.90
Fairfield,Ala. T2 ....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 ....5.65
Geneva,Utah C11 ....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....6.15
Johnstown,Pa. B2 ....5.65
Munhall,Pa. U5 ....5.65
Pittsburgh J5 ....5.65
Seattle B3 ....6.55
Sharon,Pa. S3 ....5.70
So.Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 ....5.65
Youngstown Y1 ....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..5.05
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....4.75
Johnstown,Pa. B2 ....4.75
Munhall,Pa. U5 ....4.75
Sharon,Pa. S3 ....5.20
So.Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2 ..4.75

FLOOR PLATES
Cleveland J5 ....4.75
Conshohocken,Pa. A3 ....4.75
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 ....4.75
So.Chicago,Ill. U5 ....4.75

PLATES, Ingot Iron
Ashland,(.(15) A10 ....3.95
Ashland,le(15) A10 ....4.45
Cleveland,c.l. R2 ....4.30
Warren,O.c.l. R2 ....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ....3.70
Aliquippa,Pa. J5 ....3.70
Ashland,Ky.(15) A10 ....3.70
Bessemer,Ala. T2 ....3.70
Clairton,Pa. U5 ....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 ....3.70
Coatesville,Pa. L7 ....4.15
Conshohocken,Pa. A3 ....4.15
Fairfield,Ala. T2 ....3.70
Fontana,Calif.(30) K1 ..4.30
Gary,Ind. U5 ....3.70
Granite City,Ill. G4 ....4.40
Geneva,Utah C11 ....3.70
Harrisburg,Pa. C5 ....6.30
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 ....3.70
Pittsburgh J5 ....3.70
Seattle B3 ....4.60
Sharon,Pa. S3 ....3.95
So.Chicago,Ill. U5, W14 3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1 3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.45
Geneva,Utah C11 ....4.85

PLATES, Wrought Iron
Economy,Pa. B14 ....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ....3.70
Aliquippa,Pa. J5 ....3.70
Alton,Ill. L1 ....4.15
Atlanta,Ga. A11 ....4.25
Bessemer,Ala. T2 ....3.70
Buffalo R2 ....3.70
Canton,O. R2 ....3.70
Clairton,Pa. U5 ....3.70
Cleveland R2 ....3.70
Detroit R7 ....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2,Y1 3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
N.Tonawanda,N.Y. B11 ..3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
So.Chicago R2, U5, W14 3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....3.70
Atlanta A11 ....4.25
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Niles,Calif. P1 ....5.05
Portland,Oreg. O4 ....4.65
SanFrancisco S7 ....4.85

BAR SIZE ANGLES, H.R. CARBON
Bethlehem,Pa. B2 ....3.80

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.30
Buffalo R2 ....4.30
Canton,O. R2 ....4.30
Canton,O.(29) T7 ....3.95
Clairton,Pa. U5 ....4.30
Detroit R7 ....4.45
Ecorse,Mich. G5 ....4.65
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.30
Houston,Tex. S5 ....4.70
Ind.Harbor,Ind. I-2, Y1 4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ....4.30
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.30
Midland,Pa. C18 ....4.30
So.Chicago R2, U5, W14 ..4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 ....4.30
Warren,O. C17 ....4.30
Youngstown U5 ....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....4.55
Gary,Ind. U5 ....4.55
Youngstown U5 ....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.55
Bessemer,Ala. T2 ....5.55
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.55
Cleveland R2 ....5.55
Fairfield,Ala. T2 ....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1..6.05
Johnstown,Pa. B2 ....5.55
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.25
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 ....6.05
Youngstown U5 ....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2 4.55
Buffalo B5 ....4.60
Camden,N.J. P13 ....5.00
Carnegie,Pa. C12 ....4.55
Chicago W18 ....4.55
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A7 ....4.55
Elyria,O. W8 ....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay,Wis. P7 ....4.55
Hammond,Ind. L2, M13 4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
LosAngeles R2 ....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 ....4.55
Newark,N.J. W18 ....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 ....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa. (5) K3..5.00
Struthers,O. Y1 ....4.55
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 ....5.40
Buffalo B5 ....5.40
Camden,N.J. P13 ....5.80
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.45
Cleveland C20 ....5.40
Detroit P17 ....5.55
Donora,Pa. A7 ....5.45
Elyria,O. W8 ....5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13 5.40
Hartford,Conn. R2 ....5.80
Harvey,Ill. B5 ....5.40
Lackawanna,N.Y. B2 ....5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14 5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
ChicagoHts.(3,4) I-2 ....4.75
Franklin,Pa.(3,4) F5 ....4.75
FortWorth,Tex.(26) T4 ....4.85
Huntngtn,W.Va.(3) W7..5.50
Marion,O.(3) P11 ....4.75
Moline,Ill.(3) R2 ....3.80
Tonawanda(3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover.(Eng.Bolt) U1 ..13.50
Dover.(Wrgh.Iron) U1 ..12.25
Economy,Pa.(S.R.) B14..9.60
Economy,Pa.(D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK.Rks.(Staybolt)L5 14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ..13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ....3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.30
Ind.Harbor,Ind. I-2 ....3.70
IndianaHarbor,Ind. Y1..6.05
Johnstown,Pa. B2 ....5.55
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.40
Niles,Calif. P1 ....5.05
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 ....6.05
Youngstown U5 ....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2 4.55
Buffalo B5 ....4.60
Camden,N.J. P13 ....5.00
Carnegie,Pa. C12 ....4.55
Chicago W18 ....4.55
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A7 ....4.55
Elyria,O. W8 ....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay,Wis. P7 ....4.55
Hammond,Ind. L2, M13 4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
LosAngeles R2 ....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 ....4.55
Newark,N.J. W18 ....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 ....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa. (5) K3..5.00
Struthers,O. Y1 ....4.55
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 ....5.40
Buffalo B5 ....5.40
Camden,N.J. P13 ....5.80
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.45
Cleveland C20 ....5.40
Detroit P17 ....5.55
Donora,Pa. A7 ....5.45
Elyria,O. W8 ....5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13 5.40
Hartford,Conn. R2 ....5.80
Harvey,Ill. B5 ....5.40
Lackawanna,N.Y. B2 ....5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14 5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland, J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

Alabama City,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10

BLUED Stock, 29 ga

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H R or C R (22 Ga.) COILS (Cut Lengths 1/2c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W10 (cut lengths)			7.25	8.50	9.30
Brackenridge,Pa. A4			7.75	9.00	9.80
GraniteCity,Ill. G4 (cut lengths)			7.95	9.20	....
Ind.Harbor,Ind. I-2	6.95	7.25	(34)		
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)		6.75	7.25		
Vandergrift,Pa. U5		7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10		7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1/2c lower)

Transformer Grade	72	65	58	52
BeechBottom,W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	....	....	....
Vandergrift,Pa. U5	10.35	10.90	11.69	12.40
Warren,O. R2	10.35	....	....	....
Zanesville,O. A10	10.35	10.90	11.60	12.40

H R or C R COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C R.)	....	....	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	....
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	....
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	....
SparrowsPt. B2	5.60	....
Torrance,Cal. C11	6.35	....

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Beasemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.00
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	3.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32)B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	....	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	....	....	7.70	9.65	....
Carnegie,Pa. S18	....	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	....	....
Detroit D2	5.60	6.65	7.25	....	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	....	....	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	....	....
NewYork W3	....	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8: Cleve.orPitts Base	....	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	....	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	....	6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton,N.J. R5	....	....	....	10.30	12.50	15.35
Harrison,N.J. C18	....	....	....	10.30	12.50	15.35
NewYork W3	....	....	....	10.30	12.50	15.35

Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S3	5.85
Youngstown U5	5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40)T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewkBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa.(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
SharonPa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bourdi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div.
Borg-Warner Corp.
F6 Frtez-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn. (10)#15	10.75
Carnegie,Pa. #18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn,Conn. (10)#15	10.75
Pawtucket,R.I.(11); N8	10.75
Pawtucket,R.I.(12); N8	11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.30
Youngstown C8	10.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COPPERAGE HOOP

Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19)K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville MS	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.,Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.85	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

ROPE WIRE (A) (B)

Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass.W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill. L1	5.05
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. MS	5.10
Donora,Pa. A7	4.85
Duluth,Minn. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8 ga. I-1	5.50
No.Tonawanda,Bl1	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. MS	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) N8	6.85
Trenton,N.J. R5	6.15
Worcester,Mass. A7	6.15
Worcester,Mass. T6	6.50
Worcester,Mass. W12	6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1)K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsville MS	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass.W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.45
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12	6.55
Worcester,Mass. J4	6.75

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. MS	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Barbed Col.

AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	141
Atlanta A11	144
Bartonville,Ill.(19) K4	144
Crawfordsville,Ind. MS	146
Donora,Pa. A7	141
Duluth,Minn. A7	141
Fairfield,Ala. T2	141
Houston,Tex. S5	149
Johnstown,Pa. B2	141
Joliet,Ill. A7	141
KansasCity,Mo. S5	153
Kokomo,Ind. C16	143
Minnequa,Colo. C10	147
Monessen,Pa. P7	146
Pittsburg,Calif. C11	161
Portsmouth,O.(18) P12	148
Rankin,Pa. A7	141
So.Chicago,Ill. R2	137
So.SanFran.,Calif. C10	161
SparrowsPoint,Md. B2	143
Sterling,Ill.(1) N15	141

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill. K4	123
Crawfordsville,Ind. MS	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
New Haven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	127
Ala.City,Ala.,17-19ga.R2	214
Aliquippa,Pa.9-14½ga.J5	131
Atlanta A11	134
Bartonville,Ill.(19) K4	131
Crawfordsville,Ind MS	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Johnstown,17ga.,6" B2	206
Johnstown,17ga.4" B2	208
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	139
Monessen,Pa. P7	134
Pittsburg,Calif. C11	154
Portsmouth,O.(18) P12	138
Rankin,Pa. A7	131
So.Chicago,Ill. R2	127
Sterling,Ill. (1) N15	131

FENCE POSTS

Chicagofilts., Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon, Pa.(31) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

NAILS & STAPLES, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. MS	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	134
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

NAILS, Cut (100 lb keg)
To dealers (33)

Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. 10	7.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bassemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

AXLES

Ind.Harbor,Ind. R13	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	All No. 2	Std. Toe Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...	(16)4.00
Lackawanna,N.Y. B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monnarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb. Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Div.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 YoungstownSheet&Tube

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co		
18	4	1	...	1.505	
18	4	2	...	1.650	
20.25	4.25	1.6	12.25	3.535-3.675	
19	4	2	7	2.460	
18.25	4.25	1	4.75	2.125	
15	4	2	9	2.445-2.45	
13.5	4	3	...	1.6023	

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Footnotes:
(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 2 cols. lower.
(8) 14 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Plate only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) 26 Ga. 28" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 7.25c for cut lengths.
(35) 12" and narrower.
(36) 24" and narrower.
(37) 15 gage & lighter; 48" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.033"; 0.033" and heavier, 0.25c higher.

Winning hand for the West

On the West Coast, only one steel plant—Kaiser Steel—holds the five "cards" necessary for complete integration—iron ore, coal deposits, blast furnaces, open hearth furnaces, and finishing mills.

Because Kaiser Steel owns and operates all these resources and facilities, western manufacturers of essential military and civilian products get this pay-off:

A source of new metal, produced from iron ore and smelted in a blast furnace. This is especially important because of the limited supply of scrap for remelting into steel. *New* metal means *more* metal for the West Coast.

This is an important reason why the West Coast's only integrated, independent steel plant is playing a major part in building a stronger West . . . and a stronger nation!

It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	B	C	Galvanized D	E	F
⅛	5.5c	0.24	34.0	32.0	....	+0.5	+2.5	....
¼	6.0	0.42	28.5	26.5	....	+3.5	+5.5	....
⅜	6.0	0.57	23.5	21.5	....	+10.0	+12.0	....
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	40.0	41.0	20.5	18.5	19.5
1½	27.5	2.78	42.5	40.5	41.5	21.5	19.5	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36½% on 3½", 4"; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ¼", 2 points lower on ⅜" and ½". Wheatland, Pa. W9, 2 points lower on ⅛", ¼", ⅜"; Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 4% on ⅛", plus 6% on ¼", plus 13% on ⅜" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ½", 2 points lower on 1", 1¼", 2", 1½ points lower on 1¼", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½% on 3½" and 4"; Youngstown Y1, Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Galv. B	Elec. Weld Black C	Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2¾	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates— Carbon Base 10%	Plates— Carbon Base 20%	Strip— Cold-Rolled Carbon Base 10%	Strip— Cold-Rolled Carbon Base Both Sides	Sheets— Carbon Base 10%	Sheets— Carbon Base 20%	Sheets— Cu Base Both Sides
302	....	....	....	....	19.75	26.24–27.50	77.00
304	25.00	29.50	....	....	24.50	27.50–27.77	77.00
309	30.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	34.00	....	....	26.00	35.92–36.50	....
317	34.50	39.00	....	....	....	....	....
318	33.50	38.00	....	....	....	....	....
321	26.50	31.00–32.00	....	....	23.00	33.00	111.00
347	27.50	32.00	....	....	24.00	33.50–33.83	130.00
405	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....
Nickel	33.55	45.15	41.00	54.00	....	....	....
Inconel	41.23	54.18	....	....	....	....	165.00
Monel	34.93	46.28	....	....	....	....	....
Cupper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	15
⅝-in. & ¾-in.	18.5
⅞-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	14
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P. Square:	Reg. Hvy.
½-in. & smaller	15 15
⅝-in. & ¾-in.	12 6.5
⅞-in.-1-⅛-in.	9 1
1-⅛-in. & larger	7.5 1
H.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ¾-in.	16.5 6.5
⅞-in.-1-⅛-in.	12 2
1-⅛-in. & larger	8.5 2
C.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ¾-in.	23 17.5
⅞-in. & 1-⅛-in.	19.5 12
1-⅛-in. & larger	12 6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ¾-in.	29.5	22
⅞-in.-1-⅛-in.	24	15
1-⅛-in. & larger	13	8.5
		Light
½-in. & smaller		35
⅝-in. to ¾-in.		28.5
⅞-in. to 1-⅛-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	42
⅞-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
⅞-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged: per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c

⅞-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to Jobbers List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$45.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95

CARBON

35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	39.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Balt., Types 301-347 sheet, except 303 and 309; K2.

Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347 & 0.50c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 36.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00

Toluol, one deg. 26.00-33.00

Industrial xylol, 25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia $32-$45

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums) ..17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron	Cents
98+% Fe, carlots, 17.00	
Swedish, c.l.f. New York, in bags	8.85-9.95
Electrolytic Iron:	
Annealed, 99.5% Fe.	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	.83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	31.25-60.00
Phosphor-Copper, 10 ton lots	50.00
Copper:	
Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver, 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten	Dollars
Melting grade, 99%, 60 to 200 mesh, freight allowed:	
1000 lb and over	6.00
Less than 1000 lb	6.15
98.8% minus 65 mesh, freight allowed:	
1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum:	
99.9%, minus 200 mesh	3.25
Chromium, electrolytic 99% Cr min.	3.80

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvil.fur.	$14.50-15.00
Connelsvil.fdry.	17.00-18.00
New River foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearny, N. J. ovens	$23.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	23.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	23.70
Nevillelsland,Pa.,ovens	23.00
Swedeland, Pa., ovens	22.90
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	24.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.

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When you don't know which way to turn for special steels—turn to Crucible!

For, in spite of industry shortages, we are maintaining quite full stocks at our warehouses of many of our 400-odd specialty steels—including complete stocks of tool steel.

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Stocks maintained of:
Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting and Plastic Die Steel, Drill Rod, Tool Bits and Hollow Drill Steel) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . AISI Alloy, Max-el Machinery, Onyx Spring and Special Purpose Steels.

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WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡		Carbon	Floor
New York (city)	6.54	7.21	8.55	7.05	...	6.62	7.53	9.28	6.37	6.71	7.98
JerseyCity(c'try)	6.24	6.91	8.25	6.75	...	6.32	7.23	8.98	6.07	6.41	7.68
Boston (city) ..	6.40	7.18	8.63	6.35	...	6.25	7.04	9.00	6.40	6.56	7.84
Boston (c'try) .	6.20	6.98	8.43	6.15	...	6.06	6.84	9.20	6.20	6.06	7.64
Phila. (city) ..	6.97	7.06	8.38	6.33	7.11	6.30	7.16	8.92	6.13	6.34	7.40
Phila. (c'try) ..	6.72	6.80	8.13	6.08	6.86	6.05	6.91	8.67	5.88	6.09	7.15
Balt. (city)	6.22	7.00	8.40	6.23	...	6.21	6.83	...	6.33	6.33	7.57
Balt. (c'try) ..	6.02	6.80	8.20	6.03	...	6.01	6.63	...	6.13	6.13	7.37
Norfolk, Va. ..	6.78	...	...	...	...	6.00	7.20	...	6.30	6.30	7.15
Richmond, Va..	5.95	6.57	8.10	6.14	...	5.91	6.59	...	6.22	6.86	7.47
Wash. (w'hse).	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)..	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††§	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††§	5.80	6.05	7.35
Pitts. (w'hse)..	5.50	6.32	7.85	5.59	6.90	5.45	6.20	10.30††	5.65	5.65	6.89
Detroit (w'hse).	5.75	6.47	8.12	5.76	7.15	5.76	6.64	9.13	6.09	5.88	7.21
Cleveland (del.)	5.74	6.52	8.16	5.85	7.18	5.82	6.60	8.91	6.15	6.15	7.39
Cleve. (w'hse).	5.54	6.32	7.96	5.65	6.98	5.62	6.40	8.71	5.95	5.95	7.19
Cincin. (city)..	5.99**	6.53	8.44	6.15	...	5.90	6.79	...	6.24	6.29	7.43
Chicago (city)..	5.76	6.55	8.08	5.77	...	5.67	6.50	10.50††	5.88	5.90	7.09
Chicago (w'hse)	5.56	6.35	7.88	5.57	...	5.47	6.30	10.30††	5.68	5.70	6.89
Milwau. (city) .	5.90	6.76	8.21	5.85	...	5.83	6.76	10.85††	6.01	6.06	7.25
Milwau. (c'try)	5.70	6.56	8.01	5.65	...	5.63	6.56	10.65††	5.81	5.86	7.05
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)..	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city).	5.75	6.55	6.90§	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75§	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.06§	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)..	6.35	7.90	8.85§	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
Seattle-Tacoma.	7.04	8.64	9.25	7.04	...	6.70	8.80	10.35	6.54	6.78	8.73
San Francisco..	6.62	7.88§	9.10§	6.60	...	6.45	8.20	11.15	6.45	6.37	8.53

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 16 gage; †† as annealed; §§ 15 gage. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; §—500 to 1499 lb; ‡—450 to 1499 lb; ¶—3500 lb and over; ¶—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit del., E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.6c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $75, Palmerton, Pa.; $75, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed, $197; gross ton lots, packed, $212; less gross ton lots, packed, $229; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Ashtabula, O. | Base price: $187, Johnstown, Pa.; $185, Sheridan, Pa.; $188, Etna, Pa.; $190, Chattanooga, Tenn.; $186, Anaconda, Mont.

Shipment from Pacific Coast warehouses by one seller, add $33 to above prices f.o.b. Los Angeles or Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244 f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c, ton lots 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.). Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload, lump, bulk, 34c per lb of metal; packed, 34.75c; ton lot 36.25c; less ton lot 38.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: 40,000 lb or more, 28c; 2000 to 39,999 lb, 30c; 250 to 1999 lb, 32c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars, Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si 9.90c per lb of alloy, carload packed, 10.65c, ton lot 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Silcas Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr, 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ¼" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe) Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth $1.14, packed in bags containing 20 lb of molybdenum; Washington, Pa., $1.13.

NOTE: Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 101, Jan. 14 issue; calcium, zirconium and briquetted alloys, page 109, Jan. 21. Refractories prices also were published on page 109, Jan. 21 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Oct. 23, 1951

STEELMAKING SCRAP COMPOSITE

Jan. 24	$43.00
Jan. 17	43.00
Dec. 1951	43.00
Jan. 1951	46.33
Jan. 1947	31.20

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin, and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Basing Point	No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades	
2. No. 1 Busheling	Base
3. No. 1 Heavy Melting	—$1.00
4. No. 2 Heavy Melting	— 1.00
5. No. 2 Bundles	— 1.00
6. Machine Shop Turnings	—10.00
7. Mixed Boring & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00
Elec. Furnace and Fdry. Grades	
11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00
30. Hard Steel cut 2 ft & under	+ 3.00
31. Old Tin & Terne Plated Bundles	—10.00

Unprepared Grades

When compressed constitutes:

32. No. 1 Bundles	— 6.00
33. No. 2 Bundles	— 9.00
34. Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only upon OPS authorization or when sold for use in electric and open-hearth furnaces or foundries.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

(6) Prices for Grade 30 may be charged only when sold upon OPS authorization to a gray iron foundry; otherwise price for Grade 20 will prevail.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2. No. 2 Heavy Melting Steel	—$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, Switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or/steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angles, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00
36. Unprepared scrap, not suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.

(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3. For preparing into:

(4) Grade No. 25, $6.

(5) Grade No. 19, $6.

(6) Grades No. 12, No. 13, No. 14, No. 16 or No. 20, $10.

(7) Grade No. 17 or No. 21, $11.

(8) Grade No. 18, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

For preparing into:

(3) Grade No. 16, $4.

(4) Grade No. 17, $5.

(5) Grade No. 18, $7.

(6) Grade No. 21, $4.

(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premiums for Alloy Content

No premium may be charged for alloy content except $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.

Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 85c.

Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.

Coatesville, Pa., 50c; Conshohocken, Pa., 20c.

Detroit, 95c; Duluth, Minn., 50c.

Harrisburg, Pa., 51c; Houston, 57c.

Johnstown, Pa., 75c.

Kansas City, Mo., 78c; Kokomo, Ind., 51c.

Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.

Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.

St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.

Warren, Pa., 75c; Weirton, 70c.

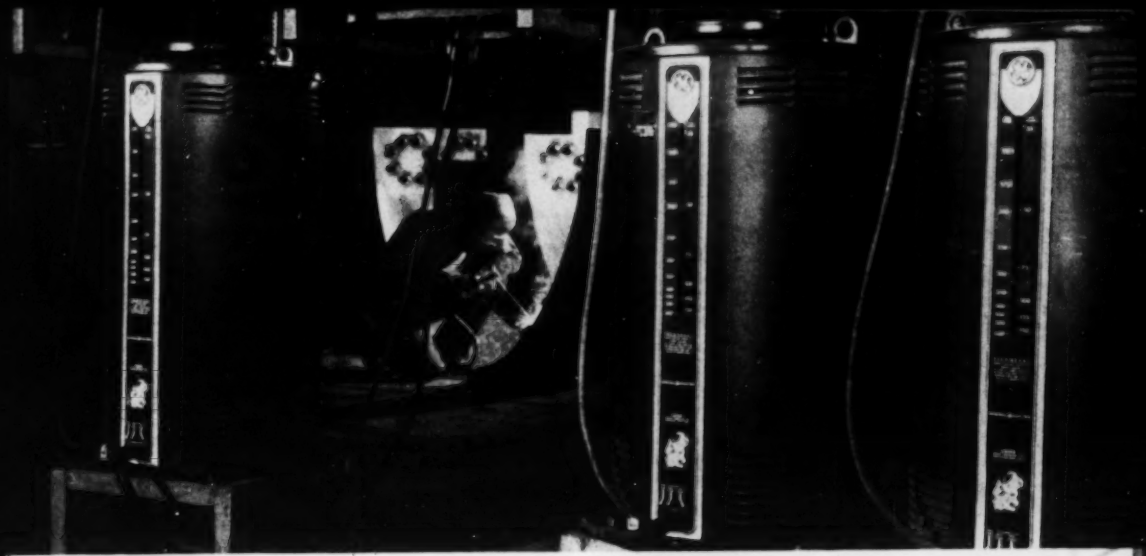
Youngstown, 75c.

HAMILTON, ONT.

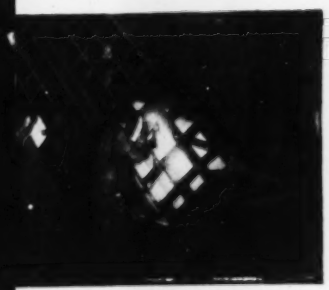
(Delivered Prices)

Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory:	
Prep'd.	33.00
Unprep'd.	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	55.00

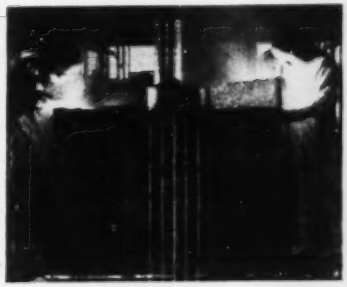
* F.o.b. shipping point.



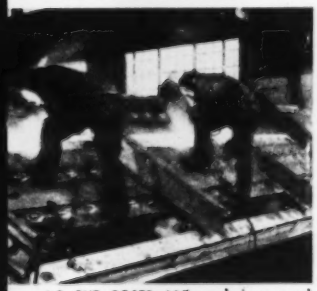
BEST FOR 3 OUT OF 4 WELDING JOBS!



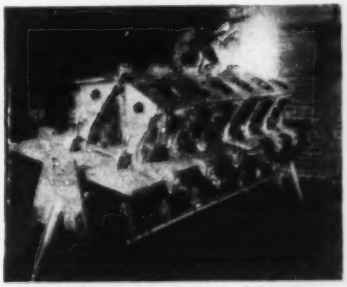
WELDING SPEEDS INCREASED 20% after this company switched to AC. Deposition rates may be doubled because AC permits the use of higher currents and larger electrodes.



AC ELIMINATES TROUBLESOME ARC BLOW, permitting these weldors to deposit ⅜ inch fillet up to 20% faster. AC is the ideal choice for deep fillet welding because the operator can easily control the arc.



AC CUT COSTS 10% and increased welding speeds 15% for this iron works. With AC, you save four ways —on labor, electrodes, power and original cost.



IMPROVED WELD QUALITY enabled this plant to meet rigid specifications on diesel engine crank cases and marine gear cases. The absence of arc blow makes it easy to deposit weld metal smoothly and uniformly, even in grooves and corners.

G-E AC Welders Increase Speed, Improve Weld Quality, Cut Costs, Eliminate Arc Blow

See Your G-E Arc Welding Distributor for complete information on G-E AC welders. They are available in 200- to 500-amp ratings for indoor or outdoor use. Most models are available on short delivery. Your distributor also carries a complete line of DC, engine-driven, Inert-Arc and Atomic-Hydrogen welders, plus electrodes and accessories. You can find your nearest distributor's name by looking for General Electric under "Welding Equipment" in the yellow pages of your telephone directory.

Section E711-20, General Electric Company, Schenectady 5, N. Y.

Please send me immediately publications on the following G- AC welders.

× for immediate project
√ for reference

- ☐ 200-amp, GEC-553
- ☐ 300-amp, GEC-652
- ☐ 400-amp, GEC-750
- ☐ 500-amp, GEC-812
- ☐ 300-amp Indoor or Outdoor Model, GEC-779

Name .....

Company .....

Address .....

City ..... **State** .....

GENERAL ELECTRIC

Your Stamping Ground for new products

with *Carpenter* Stainless

• Let's say you have a really good idea for an improved product in 195X. But there's just one hitch. You will need a Stainless Steel that has a combination of properties different from any Stainless ever made.

You might need the rustproof qualities of Stainless *combined with* special hardness limits to control spring-back of formed parts. Or, special tolerances combined with extreme ductility might be your answer to producing that good idea at a profit.

The job shown here was just that ticklish, when someone said, 'Let's call Carpenter'. If that sounds 'too easy' a way to solve a Stainless engineering problem, try it yourself. Drop us a line about your future products and the special things you would like Stainless Steel to do for you.

Doing the unusual with Stainless is a habit here at Carpenter. For example, one new steel is Carpenter Stainless No. 10, a chrome-nickel grade with an exceptionally low rate of work hardening. Maybe it has a place in your future planning, to solve the problem of cold working that can add to fabricating costs. Stainless No. 10 and many other Carpenter Stainless Steels are described in our 'Working Data' book. Would you like a copy?

The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.
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DON'T WAIT... COOPERATE!
The U.S. Needs Your Steel Scrap Now

Carpenter
STAINLESS STEEL
takes the problems out of production

The Metal Market

Consumers of lead, zinc and tin foresee larger supplies as imports increase. Improvement in copper supply expected to be delayed until late 1952 or early 1953

PROSPECTS for larger supplies of lead, zinc and tin are improving steadily. The flow of these metals from foreign sources has increased after dropping sharply last year. In 1951, compared with those in the previous year, imports of lead declined nearly 60 per cent to 163,369 tons; of zinc, about 45 per cent to 80,296 tons; of tin, about 43 per cent to an annual rate of 62,292 tons on the basis of imports for the first 10 months.

Supplies of refined copper are not expected to increase substantially until late in 1952 or early in 1953. Consumers abroad continue to pay as much as 40.00c a pound for refined copper, which eliminates competition from buyers in the United States. Domestic refiners using imported raw materials are permitted to sell an equivalent amount of their refined copper output at 27.50c a pound, or 3 cents above the ceiling price for domestic copper.

The government is protecting its supply position by paying over-the-ceiling prices for output of high-cost mines. First of this type of contract signed was between Defense Materials Procurement Agency and Calumet & Hecla Consolidated Copper Co., Calumet, Mich. Under the contract terms, Calumet will continue to operate four "high-cost" deposits and receive payments in excess of the prevailing ceiling of 24.62½c per pound for lake copper. DMPA will make up the difference between the ceiling and the following prices, which are for deliveries at Hubbell, Mich.: Iroquois mine, 30.50c; No. 4 Kearsarge mine, 31.00c; Peninsula mine, 29.60c; Allouez mine, 29.70c.

Buying of Foreign Lead Lags

Government regulations are restraining the rate of increase in imports of lead. Consumers are reluctant to purchase from producers abroad because by so doing they receive smaller allocations of lower-priced domestic metal. Since both domestic and foreign lead are covered by NPA allocations, purchases of the latter are figured in the overall allotments. Foreign lead is available rather freely at 19.00c, f.a.s. Gulf ports, the duty of 1/8 cents being for buyer's account.

More Tin Expected at $1.215

Lifting of tin prices to more "realistic" levels will stimulate trade with foreign producers. Reconstruction Finance Corp. raised its selling price on Jan. 22 to $1.215 a pound for Grade A tin from $1.03, which had prevailed since Aug. 1, 1951. The new price is equivalent to $1.18, f.o.b. Singapore, which is the price the United States will pay for 20,000 tons of Malayan tin under the agreement with Great Britain.

Negotiations for a tin contract with Bolivian producers is expected to be reopened soon. Secretary of State Acheson is hopeful that an agreement can be reached. Previous talks were terminated when RFC refused to increase its offer above $1.12 a pound while Bolivia held out for $1.50 a pound.

Aluminum Price Order Revised

Revision of CPR-54 increases ceilings for certain grades of aluminum scrap and secondary ingot. Products covered include aluminum foil scrap, sweated pig aluminum or ingot, and the deoxidizing grades of secondary aluminum ingot. New ceilings on deoxidizing grades are: Grade 1, 18.8c per pound; Grade 2, 18.60c; Grade 3, 18.40c; Grade 4, 18.20c. Revision 1 to the order was effective Jan. 16.

Nickel Processing Is Hastened

International Nickel Co. of Canada Ltd. completed a 7½ mile pipeline through which the bulk concentrate from 3,650,000 tons of nickel-copper ore is being pumped annually from its newly-built Creighton concentrator to its reduction plants at Copper Cliff, Ont. This is the longest distance concentrate has been transported by pipeline in such quantity, it is believed.

"The pipeline reduces the time required to transform nickel ore into refined nickel," R. L. Beattie, vice president and general manager, says.

"The economies resulting from pipeline transportation . . . have made possible the working of lower-grade Creighton ore which is now contributing to the availability of nickel for defense production needs of the free world."

Part of International Nickel's $130 million program of underground mine expansion, the pipeline artery has been integrated into an elaborate pipeline system which also carries waste material from both Creighton and Copper Cliff to a disposal area midway between the two plants.

When milling 10,000 tons of nickel-copper ore a day at Creighton, about 1800 tons of concentrate and 8200 tons of waste material are produced. Water added to the concentrate makes a pulp which flows through the pipeline at a rate of 800 gallons per minute. The tailing pulp flows at a rate of 2500 gallons per minute.

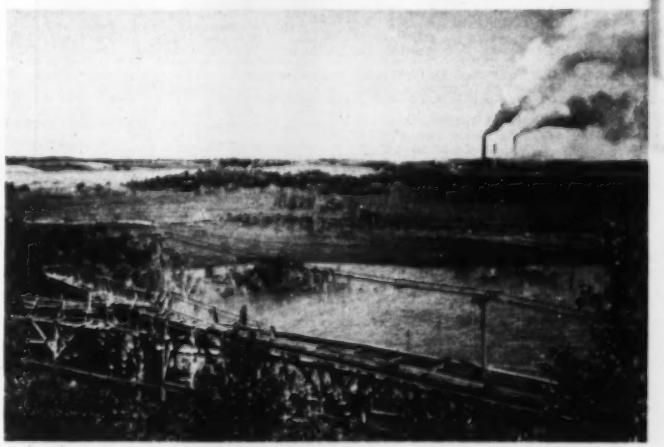
U. S.-U. K. Exchange Metals

Under an agreement between the United States and United Kingdom:

The U. S. will supply to U. K. 1,108,000 net tons of steel scrap and pig iron, deliveries being tentatively scheduled at 135,000 tons in first quarter, 250,000 tons in second, 361,500 in third and 361,500 tons in fourth quarter of 1952.

The U. K. will supply 5000 metric tons of aluminum in each of the last three quarters of 1952 on the same financial terms as those which applied to the original loan of 10,000 metric tons. The amount actually delivered shall be replaced by the U. S. not later than June 30, 1953.

The U. K. will deliver 20,000 long tons of tin by Jan. 1, 1953, in roughly equal quarterly installments, on a price basis of $1.18 per pound of Straits tin or equivalent, f.o.b. port of shipment, subject to upward revision if U. S. pays a higher price to another supplier.



INTERNATIONAL NICKEL'S PIPELINE EXTENSION

. . . it carries nickel concentrate 7½ miles from Creighton to Copper Cliff, Ont.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 88-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c. East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.80c; grade 2, 18.60c; grade 3, 18.40c; grade 4, 18.20c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 121.50c.

Antimony: American 99-99.8% and over but not meeting specifications below 50.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 50.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $208-$211 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.28; yellow brass free cutting, 32.63; commercial bronze, 95% 41.30; 90% 40.82; red brass 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90% 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.80; 90% 41.42; red brass, 85% 40.43; 80% 39.96; best quality brass, 39.44.

(Base prices, effective Dec. 26, 1951)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 28.545; 30,000 lb lots, 28.67; l.c.l. 29.17. Weatherproof, 100,000 lb, 30.35; 30,000 lb, 30.60; l.c.l., 31.10. Magnet wire, del., 15,000 lb or more, 34.50; l.c.l., 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Width s or Diameters, in., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R-317-T4	—Hexagonal— 17S-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	43.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $21.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 65%.

ZINC

Sheets 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50-26.50c; over 12-in., 25.50-26.50c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c, 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25-lb cans only, less than 100 lb to consumers 58.7c; 100 or 350 lb drums only, 100 to 600 lb 71.6c; 700 to 1900 lb 63c; 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.375; 500 to 999 lb, $1.38; 200 to 499 lb, $1.385; less than 200 lb, $1.40. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11; more than 2000 lb, $1.09. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 98.5c; 100 lb kegs 99.5c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass 17.00 per lb of Cu content for 1.0 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c, old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 15.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound f.o.b. point of shipment, less than 2,000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Jan. 22-24	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Jan. 2-21	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
1951								
Dec. Avg.	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. Avg.	24.50	18.80	19.50	103.00	19.00	44.56	56.50	88.00
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.942	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Wire . . .

Wire Prices, Page 99

Chicago—Limitations on output of civilian goods have reduced demand for wire products, but all production finds a home. Among items growing easier are high carbon spring wire, upholstering nails and tacks, and larger sizes of nails. Demand for barbed wire, fencing and baling wire holds strong.

Boston — Unless defense requirements increase and balance declines in civilian demand, additional soft spots are likely in wire products in second quarter. Bed spring and furniture volume is off. Some screw manufacturing plants are cutting up wire in excess of sales. Most heading wire consumers are taking in reduced allotments in full.

Birmingham — The wire mill is taking care of most essential users. Bed spring manufacturers are getting satisfactory tonnage but jobbers are hard pressed to care for rural retailers in such items as fencing and many nail specifications.

Sheets, Strip . . .

Sheet and Strip Prices, Page 97 & 98

New York—Some easing in pressure for light flat products is noted but most producers of hot and cold-rolled sheets, also galvanized, the latter in particularly stringent supply, are sold up for second quarter. One large mill is so far behind on galvanized sheet commitments, due partly to zinc shortage, that it is virtually having to blank out second quarter. This interest estimates it will have less than 10 per cent of its second quarter production available for new orders.

Definite easing in pressure for cold-rolled strip is reported. Some sellers offer a limited tonnage for shipment before end of the current quarter, also certain specialties, such as low silicon and straight chromium sheets, on which latter consumers so far have had no difficulty in obtaining additional CMP tickets for the current quarter.

Some of the easing in pressure for light flat products is ascribed to government restrictions on use of steel and other materials, notably copper. Even in the case of the regular plain hot an dcold-rolled sheets, on which sellers are generally booked up for the first half, there is not the demand urgency noted last fall.

Philadelphia—Easing in cold-rolled sheets and strip is developing because of the cutback in consumer durable goods and, in less important degree, because of a drying up in demand. Recently, some cancellations were reported for the simple reason consumers do not need the material, either because there has been a backing up in inventories of their products or because of inability to obtain other materials, notably copper, to round out manufacturing needs. However, most producers are not concerned about ability to move cold-rolled over the next several months at least. Actually most are booked up for second quarter and declare that where there are spot openings they are quickly filled in. Demand for hot-rolled sheets is well sustained.

Boston—For first time since distribution went under control, some narrow cold strip converters are not taking in maximum allocations for second quarter, indication of easing pressure for flat-rolled. More cold-rolled, silicon, straight chromium and enameling sheets are offered, also electrolytic tin plate and long ternes. Inventories and lack of demand for fabricated products contribute to slackening in consumer buying. Steel orders are curtailed in some cases by absence of tickets due to reduced allotments. Outstanding defense inquiry is for ammunition boxes, taking large tonnage of 20 gage cold-rolled sheets.

Pittsburgh—Small, spotty inventory adjustments are noted by district mills, affording some easing in demand for cold-rolled material. Some producers are out in the field selling cold-rolled tonnage, and it is thought by late April supply and demand may be in balance. Second quarter books are filling at the usual rate. Straight chrome stainless and silicon sheets are in easiest supply in this area. Long ternes are holding up well and also galvanized sheets. Hot-rolled sheet orders are hardest to place and will remain so for some time.

Cleveland—Pressure for sheets and strip, especially cold-rolled, is off somewhat in that the mills are in receipt of noticeably fewer requests for emergency tonnage as compared with a month or so ago. Hot-rolled carbon sheets though are tight, as are galvanized. The position of the separate mills varies considerably giving the market a somewhat spotty appearance with respect to some grades of flat-rolled, including cold-rolled. Overall demand still is in excess of supply. Sellers are virtually booked full for second quarter, the few remaining openings in the schedules being expected to be taken up quickly.

The slack arising from cutbacks in civilian goods production is being largely offset by increased defense allotments and diversion of rolling time on continuous mills to production of light plates. Sellers generally feel that whatever easing in pressure has developed of late it largely is attributable to government restrictions on use rather than actual drying up of sheet needs. Indications are much easier supply conditions will prevail during last half of the year by which time substantial new rolling capacity is expected to be in operation.

Cincinnati—Schedules of district sheet mills for second quarter are nearly filled. These show progressive expansion in defense needs. Supply of cold-rolled is noticeably easier but tightness in most other grades is unrelieved.

Chicago—Although this is a good consuming area for cold-rolled sheets and strip because of manufacturing diversification this product is beginning to show some of the easing which is well defined in other districts. Occasionally bonus tonnages are offered customers by producers but the former frequently lack tickets to take advantage of the windfall.

Birmingham—Mills have not completed second quarter bookings but there is nothing in the market pointing to better supply conditions. Fabricators still want more tonnage than is available.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 97

Boston—Bids are being taken direct, Corps of Engineers, Boston, on reinforcing required for quartermaster's research laboratory, Natick, Mass., and part of the Limestone, Me., air base project; 1995 tons of bars and 1,250,000 square feet, welded wire reinforcing mesh, are needed, closing Feb. 4 and 5. Volume of concrete reinforcing bars estimated is lower with distributors in some instances booked months ahead. Design changes for reinforced concrete construction have tightened bar supply to structural steel levels.

Seattle—Rolling mill operations continue at top speed. Spring activity has not yet opened but there is a continued demand for small reinforcing tonnages. Largest project pending is Chief Joseph dam involving 16,500 tons. Albeni Falls power project and a number of major Alaska installations will require major quantities.

Steel Bars . . .

Bar Prices, Page 97

Cleveland — Expanding military and related demands are putting increasing pressure on the bar mills. Sellers here report current supply conditions tighter than at any time since the start of the emergency and they expect the stringency to intensify in the months immediately ahead. Bar mill order books are filled for second quarter except for a few openings to care for emergency military needs. Many CMP tickets are being turned away for lack of tonnage. Carryover tonnage from fourth quarter 1951 was substantial and expectations are there will be just as great overflow from first quarter to second.

Boston—While bar supply is tightest with numerous steel users, some improvement in smaller sizes next quarter is likely. Hot-topped quality stock, 1 1/2-in. and over will be hard to obtain through balance of this year. There are some openings in second quarter for alloy volume with supply improved for electric furnace alloys, including semifinished. Antifriction bearing shops are busy, but have lost some automobile volume. In aircraft, jet engine planes do not take the number of bearings required by reciprocating engine power plants. Forge shops are heaviest consumers in this area.

New York—Carbon bar sellers generally are fully booked for second quarter, except for some capacity reserved for military needs not yet specified. Due to anticipated carryovers at the end of this quarter and to the desire of Washington for producers to become fully current by end of first half, some mills are allowing for at least 30 per cent of their anticipated capacity in second quarter to meet arrearages.

The emphasis in carbon bars primarily is on the larger sizes, required for shell work and various other military needs. Bookings are far extended on open-hearth hot-rolled al-

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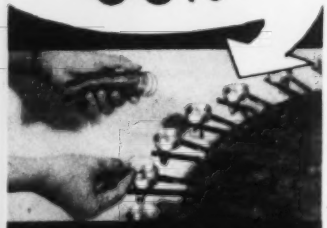

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loy bars, most mills being sold out for second quarter. Electric furnace alloys still can be booked for June shipment, however. Cold-finished alloys also are available for June delivery, but at least two sellers claim they should be completely sold up on this grade in another week or so. Cold-finished carbon bar sellers are virtually sold out for first half.

Philadelphia—Of all the major products, carbon bars appear in strongest demand. Military needs have been stepped up sharply, especially for shell steel. This is reflected not only in hot carbon, but cold-finished carbon such as is needed for fuses. Some of these requirements carry directives which supersede all others and call for immediate processing. Some cold-drawers have been forced to push some of their earlier commitments into third quarter and even beyond.

Pittsburgh—No demand letup for bars in all types and sizes is noted by district mills. As more military orders are being taken, CMP ticket holders for civilian production will have more difficulty in finding available rolling time open to them. Inquiry for forging and cold-finished material is at a high rate for these most-tight items. District sellers think the shortage of bar material will show no appreciable softening for many months—possibly not even by end of 1952.

Chicago—Impact of the shell program is more pronounced in hot rolled bars. It is off-setting declining automotive consumption and keeping demand exceedingly tight. Requirements for forging grade billets and bars cannot be fully accommodated currently or for second quarter. Cold-finished bars have lost some of their recent tightness.

Tool Steel . . .

Tool Steel Prices, Page 99

Washington — Proposal that tool steel be exempted from the Controlled Materials Plan was rejected at a meeting of the Tool Steel Industry Advisory Committee with the National Production Authority.

The proposal, made as a possible solution to the industry's inability to sell all the tool steel produced because some customers cannot get sufficient CMP allotments for alloy steel, was turned down because it was felt it might be necessary at a later date to reimpose CMP control. NPA officials said they could not consider dropping CMP controls for short periods as such action would disrupt the entire system.

An alternative proposal that NPA issue separate CMP allotments also was turned down because the task of setting up such separate accounts would make the CMP system cumbersome. It was agreed, however, NPA would see if some plan can be worked out so that CMP allotments for tool steel can be differentiated from those issued for alloy steel.

Regarding recent complaints Canadian producers have advantages in foreign markets because they are not subject to controls imposed on American industry, NPA officials said the Canadian government, beginning Feb. 1, will impose the same

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See Page 3

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type of controls in Canada on tool steels as are in effect here.

A Munitions Board representative detailed to the meeting the new specifications for stockpiling tungsten. An effort is being made to build a balanced stockpile that can be turned over to industry in case of emergency. Industry representatives will furnish detailed lists of various types of desirable tungsten ores and see if they can use larger quantities of high molybdenum content ores.

Plates . . .

Plate Prices, Page 97

Boston—Offerings of light plates in 50 to 100-ton lots are result of few miscalculations in booking and scheduling for late fourth quarter. Fabricators lacking tickets, some of this tonnage has moved relatively slowly. Demand for heavy gage quality plates is in excess of supply with no easing in sight. By second quarter more light stock from strip mills will be available.

Philadelphia—Although demand for light plates is a shade easier, due to more adequate supply being produced by continuous strip mills, the overall situation in plates remains tight. Producers could easily book themselves up months ahead were they disposed to accept all the business available.

Pittsburgh—No change in tight supply conditions is seen here. Rolling of lighter material on continuous hot-strip mills has taken off some of the pressure on the conventional plate mills but the heavier gages continue in limited supply. Some fabricating shops are turning down inquiries because of inability to secure needed steel. Plates should remain on the scarce list for at least the remainder of 1952.

Cleveland—Mills anticipate additional directives from the government for production of light plates on continuous sheet mills. Substantial tonnage of plates already is being rolled on these mills, relieving the conventional plate mills considerably. But still larger demand appears to be heading toward the continuous mills. Meanwhile, plate sellers see no relief in the supply stringency in sight, especially with respect to the heavy gages.

Birmingham — Demand for plates continues at the same high level prevailing here for months. Major users are on allocation and there are no plates for those without CMP tickets.

Seattle—Plate fabricators are figuring on a number of industrial plant expansions involving plates. Small shops are struggling under severe handicaps and are seeking defense subcontracts.

Semifinished Steel . . .

Semifinished Prices, Page 97

Pittsburgh — Steelmaking operations held steady on the revised capacity at 98 per cent last week. U. S. Steel has open-hearth furnaces down due to the critical scrap shortage and Pittsburgh Steel is enlarging others. Wheeling rate remains unchanged at 100.5 per cent. One local mill is sending ingots to England.

Tubular Goods . . .

Tubular Goods Prices, Page 101

Boston—Light welded tubing volume has slipped, notably for most metal furniture lines. More galvanized pipe is scheduled for March, but tonnage is not likely to fill gaps left by the stoppage of shipments by some producers in recent weeks. Distributors are taking quotas and utility buying is active.

New York—Restricted building operations, partly seasonal, are reflected in easing demand for merchant pipe. Some distributors are passing up their regular monthly allotments on occasion, but others are taking tonnage in regularly. Smaller distributors appear hit the hardest by decline in demand. Their cancelled tonnage, in the aggregate, is not too important. Broadly, pipe and tube makers confront far more demand than they can promptly handle.

Cleveland—Not much change in the tight pipe supply situation is expected over coming months. This is especially true of large diameter pipe, 3½-in. and larger. In sizes 3-in. and smaller, however, demand is slightly less pressing than it was some time back, and some jobbers have been able to build up small working inventories.

Seattle — Considerable cast iron pipe is involved in various government and defense installations.

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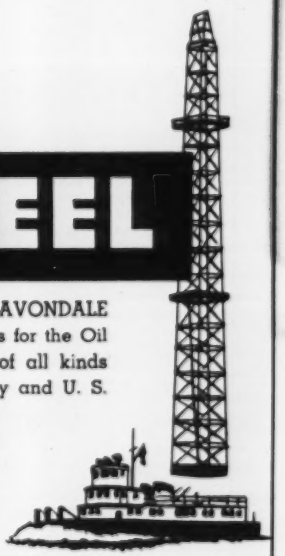

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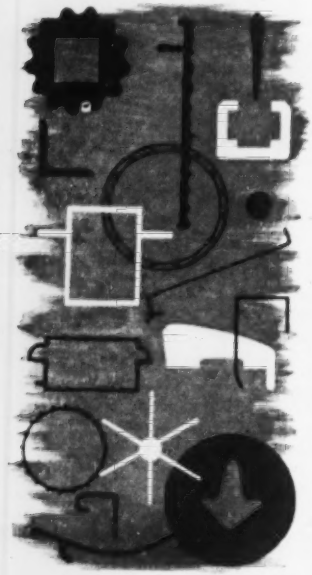

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Spring requirements will be up for bidding within 30 days. Portland has called bids Jan. 28 for 450 tons for the Rose City district. Seattle is asking tenders for a small tonnage of 4-in. bell and spigot.

Rails, Cars . . .

Track Material Prices, Page 99

Washington—Rail steel mill industry representatives, meeting with the National Production Authority, urged regulations be issued requiring 75 per cent of the used rails in Class 29 (grade suitable for rerolling and remelting) be allocated to the rail steel mills. The mills, in turn, would sort the rails and take what they can use, rending the remainder to the foundries.

Such action was held necessary to prevent waste occurring when foundries melt rails suitable for rerolling. The rerollers claim they are not now receiving an adequate supply to support full operations.

Last September the rerollers were getting an estimated 26 per cent of the used rails known as class 29 and unassorted. Now they are getting approximately 55 per cent.

Efforts are being pushed to recover an estimated 1 million tons of abandoned street car rails.

Structural Shapes . . .

Structural Shape Prices, Page 97

New York—Some sizable jobs are pending but overall structural demand here continues to lag. Essential work such as may be approved by the government continues relatively light, compared with activity in certain interior districts. Wide flanged structurals lead demand. Estimates are expected on 7500 tons, hangars, New England, next month.

For school construction, second quarter, 128,000 tons are allotted, 15,000 more than in first quarter. Of the total, 110,000 tons are for elementary and secondary schools and 18,000 tons for schools of higher education and libraries. This allotment supports 2400 elementary and secondary schools under construction and nearly 500 new starts.

Philadelphia—Structural business tends downward, due to seasonal influences and to government limitations, especially on commercial work. Even bridge work is definitely less active, reflecting in part a cutback in CMP allotments. Government approved defense work is being stepped up but not sufficiently to offset the decline in other directions. Fabricators' backlogs are shrinking accordingly, although of prime concern to fabricators is the obtaining of plain material in sufficiently steady amount to maintain schedules on tonnage already booked.

Boston—Some of the larger fabricating shops are estimating tonnage for second half only. Competition pricewise and delivery is sharper on the lower volume being estimated. Improvement is noted in scheduling revalidated tonnage for next quarter.

Pittsburgh—Demand continues far above supply for all sizes of structurals in this area. Order books are about filled for second quarter and it is expected many unplaced CMP tickets will be knocking at mill doors shortly with little prospect of success in finding open rolling time. Fabricators could use twice the amount of steel they are getting and as a result are losing considerable business.

Seattle—Potential demand for structurals is of major proportions, lettings during the next six months expected to be in record volume. Public works projects and defense installations will require large tonnages. Chief Joseph dam, bids opening at Seattle, Mar. 12, call for 2450 tons for a powerhouse and other structures. Bids for the Boeing hangar, Seattle, 3000 tons, have been set for Feb. 5. Army engineers are considering wood design alternatives for a number of warehouses to save steel.

Pig Iron . . .

Pig Iron Prices, Page 96

Cleveland—While the light castings shops are not pressing for tonnage there is no surplus of merchant iron in this area. Sellers are still apportioning their tonnage to customers, slack in demand arising from the slump in the light castings shops being offset by larger requirements of the heavy castings producers engaged on defense work. Expectations are defense work will begin to flow to the light castings makers before long with many programs only now beginning to get into full stride. Some of the heavy foundries would be on even more expanded schedules than at present were it not for the shortage of skilled labor, such as molders.

Boston—Foundries are holding pig iron melt at relatively high level, notably malleable. Total melt has not improved substantially in recent months and is probably not more than 10 per cent higher than last fall. Machine tools account for part of the trend upward, although not balancing the slump in consumer durable goods.

New York—Operations at district ferrous foundries continue to lag and pressure for pig iron is not too severe. Most suppliers, however, claim they have no difficulty disposing of available tonnage. Most consumers' inventories are under government limits. Consequently, they are willing to take in more tonnage.

Foundries are showing little interest in foreign iron which can only be had at a premium and which, at best, is not offered too freely, for the reason most European producers confront heavy demand at home or in nearby countries.

Philadelphia—While gray iron foundry operations are lagging, especially soil pipe and jobbing shops, demand for pig iron continues in excess of supply.

Pittsburgh—No lessening in demand for merchant iron is noted here. Defense castings are holding up well and helping fill in for cutbacks in consumer castings. Pittsburgh Steel's blast furnace which was out of operation for a 10-day period is back in blast.

Washington—Export quota of 2500 short tons of pig iron has been

established for first quarter by the Office of International Trade.

Tin Plate . . .

Tin Plate Prices, Page 98

Pittsburgh—Mills are hopeful second quarter pig tin allocations will be in the same amount as allocated for first quarter. During first quarter they received 7755 tons which enabled operations to continue at good production levels.

Tungsten Ore . . .

Export-Import bank approved a $580,000 loan to Compagnie Aramayo de Mines en Bolivie to assist financing expansion of tungsten production from the Pacuni mine in Bolivia. The loan will be used in large part for purchase and transportation to Bolivia of United States mining and milling equipment. The mining company will make a substantial investment from its own funds to increase tungsten concentrates production.

Scrap . . .

Scrap Prices, Page 104

Washington—Export quota of 25,000 short tons of iron and steel scrap has been established for first quarter by the Office of International Trade. Exports, previously under six months' quotas, have now been placed under a quarterly quota to permit closer co-ordination between export licensing and domestic supplies. The total quantity authorized for export in 1951 was 108,000 tons, averaging 27,000 tons per quarter.

Pittsburgh—No appreciable change in this district's critical scrap shortage is evident. Better weather the last two weeks has brought improved collections to dealers' yards but the supply is still totally inadequate.

Cleveland—Movement of scrap has increased sharply over the December rate as supplies held for tax considerations are being released. Open hearths take all tonnages offered. In the case of foundries, the pressure is definitely off. Melters will pay ceiling prices on cast iron, but refuse to exceed certain limits on freight charges. Active demand still persists in steel grades used by foundries. Auto wreckers are increasing their shipments of scrap.

Youngstown — Scrap shortage is squeezing steel mills here a little tighter. Some open hearths may be forced to suspend soon unless supplies are substantially increased.

Cincinnati—Shipments of scrap are slightly improved, tonnage moving to mills last week enabling an inventory gain. The improvement is attributed to better weather, reaction from yearend doldrums, and possibly reports of an easier steel supply situation. Cast scrap is softer and prices are not firm at the ceiling.

Philadelphia—Virtually all steel open-hearth scrap in this district is moving under allocation. All suppliers having 100 tons or more a month are being forced to sell on allocation. Need for allocation is reflected by low inventories at consuming mills. Some mills have requested allocations of No. 1 cupola cast so they can pay a price competitive with

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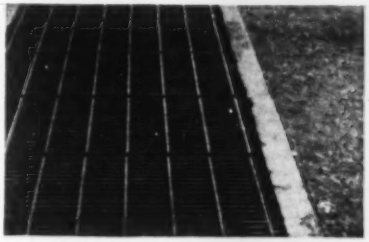

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the foundries, but such requests have not been granted. Cast grades generally are in easy supply.

Chicago—Government allocations of scrap to U. S. Steel Co.'s plants have not channeled enough material to permit the company to restore to operation the three open hearths idled at Gary at start of the year. A recently-completed open hearth of Keystone Steel & Wire Co., Peoria, Ill., cannot be put to use because of scrap insufficiency.

Boston—Steel scrap inventories at mills are down two days to one week. Outlook for improvement in supply is dimmed by lower intake by yards.

New York—Pressure for cast grades continues to ease. Operations at district foundries are spotty, only certain captive shops and those engaged in machine tool work showing any particular activity.

St. Louis — Scrap shipments improved slightly last week. Auto graveyards scrap is not coming out as well as had been hoped. Granite City Steel Co.'s scrap pile is down around the seven-day mark and hot pig consumption must increase if it is not to curtail operations.

Birmingham—Scrap is moving into yards here in relatively satisfactory volume. An occasional free tonnage is reported and demand for cast grades has eased considerably.

San Francisco—About 10,000 tons of scrap on south Pacific islands—Truk, Ponape and Marshall—are being offered for sale by the high commissioner of the trust territory of the Pacific islands. Bids will be received in writing through Feb. 29 at Building 87, Fort Ruger, Honolulu.

Seattle—Mill scrap buyers report the 90-day limit on scrapping old automobiles is speeding deliveries from auto graveyards. Receipts are improved, shipments about equalling consumption.

Warehouse . . .

Warehouse Prices, Page 103

Washington—Under Direction 1 to NPA order M-6A amended, steel distributors are required to give preferential treatment to machine tool builders' military and atomic energy orders. The regulation, effective Jan. 21 and continuing to June 16, requires warehouses to accept authorized control material orders bearing allotment symbols A, B, C, E or Z-2 in preference to other ACM orders whenever the particular product may be filled from the distributor's inventory.

Under the new regulation minimum tonnage required to be shipped to steel distributors under M-6A must be increased whenever the distributor certifies that he is entitled to it because of deliveries from his inventory to fill purchase orders bearing allotment symbols Z-2 (machine tools) or N-8 (metalworking machinery and equipment).

Boston—Steel sold to machine tool builders by warehouses under the amended preferential order may be replaced from the mills ex-base period allocations. Volume offered warehouses is slightly heavier, including cold-rolled sheets, but for the most part this volume is confined to specialties with structurals, bars and plates in wanted sizes out of balance.

Philadelphia—Warehouses report a strong demand for all major products except sheets and state that even the pressure for the latter has not eased enough to build up anything suggestive of a normal inventory.

Pittsburgh — District warehouses cannot touch many of their inquiries due to poor-to-only-fair inventories. Mill shipments in many cases have been disappointing to date. Items in shortest supply are plates, cold-finished and hot-rolled bars in addition to all types and sizes of structural shapes. Some warehouses report stocks improving and mill shipments satisfactory.

Cleveland—While there has been some slowing down in demand on the warehouses from a few directions, chiefly consumer durable goods manufacturers, volume of business continues heavy. With stocks unbalanced distributors are finding it difficult to satisfy all the orders coming to them.

Slower demand for the light flat-rolled items, such as cold-rolled sheets, is attributed chiefly to the sharp cutbacks in automobile and appliance production. All of the heavy products continue under extremely strong pressure.

Chicago—Warehouses observe demand has lost some of the frantic tone which prevailed for months but volume hasn't dropped to any great degree.

St. Louis — Warehousemen report buying frenzy is over. Markedly lower demand has created a warehouse excess of cold-rolled sheets. Makers of metal cabinets, refrigerators, stoves, and other consumer durables have become inventory-conscious. Cold finished bars, plates and structurals supplies are at a record low.

Birmingham — Warehouses report slight, but steady improvement in receipts of steel from mills. Most wanted items are not in adequate supply.

San Francisco—Closer balance in supply and demand for cold-rolled sheets is reported by some distributors, but remaining in the critical category are hot-rolled sheets and plates.

Cincinnati — Warehouses find demand in some steels receding, due in part to construction restrictions. Supply of light plates is easier.

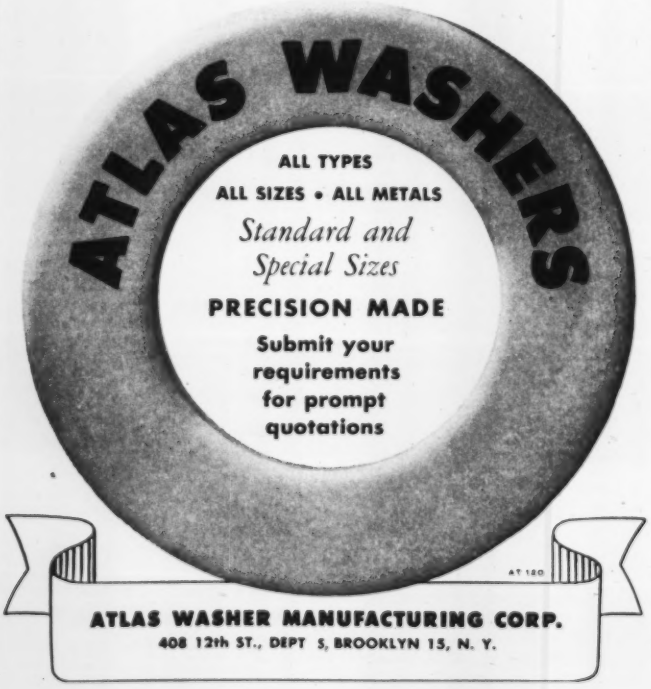
Seattle—Small metalworking shops are suffering due to lack of materials and this is reflected in warehouse volume. The warehouse price structure is not yet stabilized.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 101

Cleveland—New ceiling price order for bolts, nuts, screws and rivets, effective Jan. 21, will not substantially result in changes in price and discount lists.

The new order, CPR 118, is tailored to the individual manufacturer's position, but in general it maintains price levels established under the General Ceiling Price Regulation base period, Dec. 19, 1950 to Jan. 25, 1951. Indications are, for the industry as a whole, the level of prices is substan-



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tially the same under CPR 118 as under the general manufacturers' ceiling price regulation, CPR 22.

Generally, the new order establishes ceilings on the basis of published list prices in effect Jan. 25, 1951, subject to the same discounts, differentials, terms, and conditions of sale and delivery which the producers had in effect on that date. In addition, it permits use of customary pricing formulas, applied on the basis of base period costs, in the determination of ceilings for products which were not sold during the base period.

Cutbacks in civilian consumer durable goods manufacture are being reflected in some slackening in demand for fasteners, but substantial new defense business is developing as an offset.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3000 tons, state bridge, Montgomery county, Pennsylvania, to Bethlehem Steel Co.

2500 tons, plant addition, Fairchild Aircraft Co., Hagerstown, Md., to Lehigh Structural Steel Co., Allentown, Pa.

2200 tons, subway section, Pitkin avenue, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.; through typographical error this project was previously noted as requiring 22,000 tons.

400 tons, addition to Vancouver, Wash., plant of Carborundum Co., to Pacific Car & Foundry Co., Seattle.

250 tons, state bridge, Mattawamkeag river, Haynesville, Me., to Bancroft & Martin Rolling Mills Co., Portland, Me.; Cianchette Bros, Inc., Pittsfield, Me., general contractor.

150 tons, plant addition, Armstrong Cork Co., Lancaster, Pa., to Bethlehem Steel Co.

130 tons, warehouse and repair shop, Pennsylvania Railroad, Philadelphia, to Bethlehem Steel Co.

100 tons, bridge repairs, Pennsylvania Railroad, Cass county, Indiana, to Fort Pitt Bridge Works, Pittsburgh.

STRUCTURAL STEEL PENDING

7500 tons, warehouse, general depot, Corps of Engineers, Schenectady, N. Y.

7500 tons, Army warehouses, Voorheesville, N. Y., and Schenectady, N. Y. (both under one contract); bids closed Jan. 24.

6500 tons, hangars, including one bomber hangar, Portsmouth, N. H., others in New England; bids in February.

6000 tons, five structures comprising four hangars and an assembly-office building, Grumman Aircraft Engineering Corp., Long Island; bids closed.

4000 tons, four warehouses, Chambersburg, Pa., district office, Army Engineers, Baltimore; bids postponed indefinitely.

3000 tons, estimated, Vernon avenue bridge over Newtown creek, Department of Public Works, New York; bids Feb. 1.

3000 tons, Boeing Airplane Co. hangar, Seattle; bids Feb. 5.

2500 tons, pulp mill for Ketchikan Pulp Co., Ketchikan, Alaska; bids in near future.

2450 tons, Chief Joseph dam powerhouse; bids to U. S. Engineer, Seattle, Mar. 12.

2000 tons, University of Washington hospital; plans in preparation; bids probably June-July.

1800 tons, two Army warehouses in Alaska; bids probably in 60 to 90 days.

1000 tons, University of Oregon hospital.

1000 tons, warehouse and service building, General Electric Co., Philadelphia; bids Jan. 28.

750 tons, Pan-American hangar at Seattle-Tacoma airport; bids probably mid-1952.

500 tons, addition to Soundview pulp plant, Everett, Wash.; bids in near future.

500 tons, Bonneville Power Administration office building, Portland, Oreg.; bid date extended.

300 tons, two Army warehouses, Governors Island, New York; bids closed Jan. 22.

275 tons, state bridge, Providence, R. I.; bids Jan. 28.

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285 tons, machine shop building, McNary dam, Peter Stuart Construction Co., Portland, Oreg.; low $456,012 (steel frame); Waale-Campian Co., Portland, low $377,583 (wood).

250 tons, tire storage warehouse, Mt. Rainier Ordnance Depot; John H. Selen Construction Co., Seattle, low to U. S. Engineer, $789,179.

250 tons, buildings, Puget Sound Navy yard; bids invited soon.

230 tons, skew span bridge, Wilbur Cross parkway, Vernon, Conn.; bids Jan. 28; also 35 tons reinforcing bars.

200 tons, overhead traveling crane for Lookout Point dam, Oregon, Cyclops Iron Works, San Francisco; low $193,842 to U. S. Engineer, Portland.

125 tons, Country Side school, Newton, Mass.; Rich Bros. Construction Co., Boston, general contractor.

120 tons, two state bridges, Shawsheen river, Bedford-Billerica-Burlington, Mass., section; bids in.

100 tons, trashracks, guides, etc., Lucky Peak dam; rebids to U. S. Engineer, Walla Walla, Wash., Jan. 22.

Unstated, large warehouse for Boeing Airplane Co., Seattle; plans in preparation by the Austin Co., Seattle.

Unstated tonnage, building construction, Ft. Meade, Md.; bids Feb. 14.

REINFORCING BARS . . .

REINFORCING BARS PLACED

600 tons, senior high school, Keokuk, Iowa, to Laclede Steel Co., St. Louis.

315 tons, disposal plant Lake City district, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; Hoagley-Findley Co., general contractor.

210 tons, two-165-man barracks, Madigan Army hospital, Washington state, to J. D. English Steel Co., Tacoma, Wash.; general award to Strand & Son, Seattle, low $795,000.

140 tons, Wayne Memorial school, Wayne, Mich., to United States Steel Supply Division, United States Steel Co., Chicago.

130 tons, pumping station, Westchester, Ill., to United States Steel Supply Division, United States Steel Co., Chicago.

105 tons, Washington state overcrossing, Chehalis, to Bethlehem Pacific Coast Steel Corp., Seattle.

100 tons, hospital, New Castle, Pa., to United States Steel Supply Division, United States Steel Co., Pittsburgh.

REINFORCING BARS PENDING

16,500 tons, Chief Joseph dam powerhouse, etc.; bids to U. S. Engineer, Seattle, Mar. 12.

8740 tons, spillway stage 2, Ft. Randall reservoir project, near Lake Andes, S. Dak.; bids Feb. 15, Corps of Engineers, Omaha.

5000 tons, relief sewers, East St. Louis, Ill.

1260 tons, barracks, Ft. Eustis, Warwick County, Virginia.

1060 tons, also 122,250 square feet welded wire reinforcing mesh, Quartermaster Research laboratory, Natick, Mass.; bids Feb. 4, Corps of Engineers, Boston.

760 tons, E. 34th St. main sewer, Indianapolis.

700 tons, St. Vrain supply canal, Colorado-Big Thompson project, Colorado; bids to Bureau of reclamation, Loveland, Colo.

675 tons, building, Sperry-Farragut Corp., Bristol, Tenn.

567 tons, also 900,000 square feet welded wire reinforcing mesh, air base, Limestone, Me.; bids Feb. 5, Corps of Engineers, Boston; bids in on 269 tons, reinforcing bars, same project.

175 tons, sintering plant, Ford Motor Co., Dearborn, Mich.

175 tons, pumping and sewage plants; bids to U. S. Engineer, Walla Walla, Wash., Feb. 14.

160 tons, Washington state undercrossing, Vancouver; general contract to Carl M. Halvorson Inc., Portland, Oreg., low $185,736.

155 tons, state highway bridge, Vine brook, Bedford-Billerica-Burlington, Mass., section; bids in.

150 tons, apartment building, 1300 Astor St., Chicago.

145 tons, Jackson-Laramie Homes, Chicago.

100 tons, substructure, South End bridge, Connecticut river, Springfield-Agawam, Mass.; A. I. Savin Construction Co., Hartford, Conn., low.

Unstated, 40 barracks structures, Ft. Lewis, Wash.; bids to U. S. Engineer, Seattle, Feb. 19.

Unstated, 13 viaducts and bridges, ranging from 81 to 600 feet in length; bids to Oregon State Highway Commission, Portland, Jan. 31.

PLATES . . .

PLATES PLACED

510 tons, tank construction, Atlantic Refinery Co., Savannah, Ga., to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

6500 tons, 432 knockdown vertical steel tanks, Army Engineers, Philadelphia; bids closed Jan. 22.

2072 tons, straight web and T-steel sheet piling for Chief Joseph dam; bids to U. S. Engineer, Seattle, Mar. 12.

700 tons, three 180-foot escort patrol vessels, General Ship Engine Works, East Boston, Mass.; three also to Avondale Marine Ways Inc., Westwego, La.

500 tons, estimated, steel harbor tugs, Navy; seven to American Boiler Works, Erie, Pa.; and three to Fellows & Stewart, Wilmington, Calif., total, $2,221,000.

175 tons, plates and miscellaneous, Chief Joseph dam; bids to U. S. Engineer, Seattle, Mar. 12.

100 tons plus, naval installation, Kenai, Alaska; general contract bids in.

100 tons plus, Army installations at McChord and Larsen air fields, Washington state; bids soon.

Unstated, 1540 feet sheet metal piling and duck, Nenana, Alaska; John G. Bachner, Anchorage, low $296,114 to Alaska Railroad which will supply materials.

PIPE . . .

CAST IRON PIPE PENDING

8012 feet, 8 to 84 inch, Kennewick district levee and pump plant project; bids to U. S. Engineer, Walla Walla, Wash., Feb. 14.

450 tons, Rose City water district, Portland, Oreg.; bids Jan. 28.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian National, 49 diesel-electric locomotives, to Montreal Locomotive Works, Canadian Locomotive Co. and General Motors Diesel Ltd., London, Ont.; and Electro-Motive Division, General Motors Corp., LaGrange, Ill.

Transportation Corps, twelve 1200-hp diesel-electric locomotives, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

Transportation corps, Marietta, Pa., fourteen 44-ton and three 25-ton dual engine diesel-electric locomotives, to General Electric Co., Schenectady.

LOCOMOTIVES PENDING

Transportation Corps, 68 diesel-electric locomotive units; bids Jan. 31; 27 units will be for domestic service and 41 for service abroad.

RAILROAD CARS PLACED

Boston & Maine, three rail diesel cars, to Budd Co., Philadelphia.

Northern Pacific, 1000 box cars, 200 seventy-ton ore cars and 50 steel cabooses, to its Brainerd, Minn., shops; these along with 250 gondolas, which will be purchased from commercial shops, comprise the railroad's 1952 car program.

Transportation Corps, 965 high side gondola cars, to Magor Car Corp., New York.

RAILROAD CARS PENDING

Transportation Corps, 1000 tank cars, on which bids will be opened Jan. 31, and 119 railroad trailer cars on which bids will be opened Feb. 8; the tank cars will be of standard gage, 10,000 gallons capacity; the trailer cars will be of standard gage of 5000 tons capacity for maintenance work.

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CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Orinoco Awards Contract

Orinoco Mining Co., United States Steel Corp. subsidiary, awarded a contract to Constructora Bechtel, S. A., to act as general contractor for the construction of its Cerro Bolivar project in the state of Bolivar, Venezuela. Constructora Bechtel, an affiliate of Bechtel Corp., will supervise, direct and engineer construction of the Venezuelan mine facilities, a 90-mile railroad and highway from Cerro Bolivar to the port, and construction of port and ore loading facilities among which are power plants, material handling, housing, water supply and sewer systems.

Allegheny Ludlum Buys Site

Allegheny Ludlum Steel Corp., Pittsburgh, purchased the 160-acre industrial site known as "Murphy's Flats" on the west bank of the Allegheny river, three miles north of Freeport, Pa. The site, situated about 12 miles from the company's Brackenridge plant and easily available to its West Leechburg plant, was bought for future expansion of the company in the Pittsburgh district.

Fruehauf Building Plant

Fruehauf Trailer Co., Detroit, is erecting a branch plant at Wallingford, Conn., to replace its New Haven, Conn., branch. The building is expected to be ready for occupancy early next spring. Paul J. Motto will be manager of the Wallingford branch.

York Iron Works Organized

York Iron Works has been established in Whitesboro, N. Y., by Francis G. King.

Kaddis Plans Expansion

A. G. Kaddis Screw Products Inc., Rochester, N. Y., applied to National Production Authority for a $136,000 expansion program to increase defense production.

Firm To Sell Machine Tools

Four States Machinery Co. was organized by Walter J. Murphy, Robert R. Heidemann, David Asmus, John B. Laing and James D. Baillet. This company has offices at 5304 W. Chicago Ave., Chicago, and 606 W. Wisconsin Ave., Milwaukee, and will represent several machine tool manufacturers in those areas. Among the manufacturers represented by Four States are: Cincinnati Shaper Co., Cincinnati; Federal Press Co., Elkhart, Ind.; Globe Tool & Engineering Co., Dayton, O.; Kane & Roach Inc., Syracuse, N. Y.; Kaufman Mfg. Co., Manitowoc, Wis.; Reed-Prentice Corp., Worcester, Mass.; and Webb Corp., Webb City, Mo.

May Make New Wheel Device

Pivot Punch & Die Corp., North Tonawanda, N. Y., may organize a new company to manufacture an egg-shaped wheel device invented by John F. Kopczynski, president of the firm. The company purchased the plant, which it previously leased from Niagara Metal Products Co. and built two plant additions.

Tool Maker Expands Plant

Detroit Tap & Tool Co., Detroit, completed a 26,000 square foot expansion of its factory at Cheboygan, Mich. It was constructed to take care of the company's increased business on taps, threaded gages, thread milling cutters and other threading tools. The first machines went into production in the new plant on Nov. 16.

Specializes in Heat Treating

Electric Steel Treating Co., Bordentown, N. J., started operations Jan. 15, specializing in the heat treatment of tools and dies. John B. Guthrie Jr. is president of the new concern. Robert W. Guthrie is secretary and treasurer. Edward W. Lerch resigned from Bethlehem Steel Co. to take the position of plant superintendent.

Dallas Facilities Improved

Southern States Steel Corp., subsidiary of Laclede Steel Co., St. Louis, improved its Dallas facilities last year. The 20,000-square foot plant occupied by the company in 1947 has more than four times the capacity of the original quarters used by the firm since its incorporation in 1927.

Steel Service Moves Branch

Detroit office of Steel Service Inc., Steubenville, O., is now located in suite 720-21 of the Fisher building.

Dow Shifts Sales Dept.

Magnesium sales department, Dow Chemical Co., Midland, Mich., assumed distribution of cathodic protection products from Dowell Inc., a wholly-owned subsidiary. Dow now handles distribution of anodes, in-

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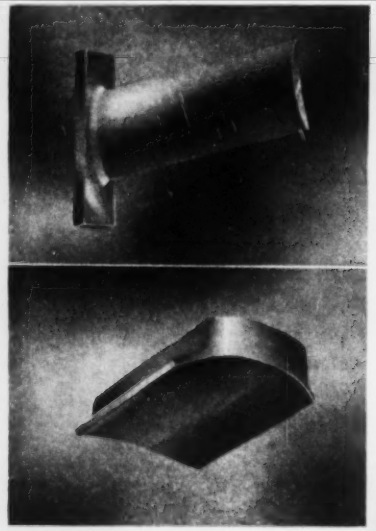
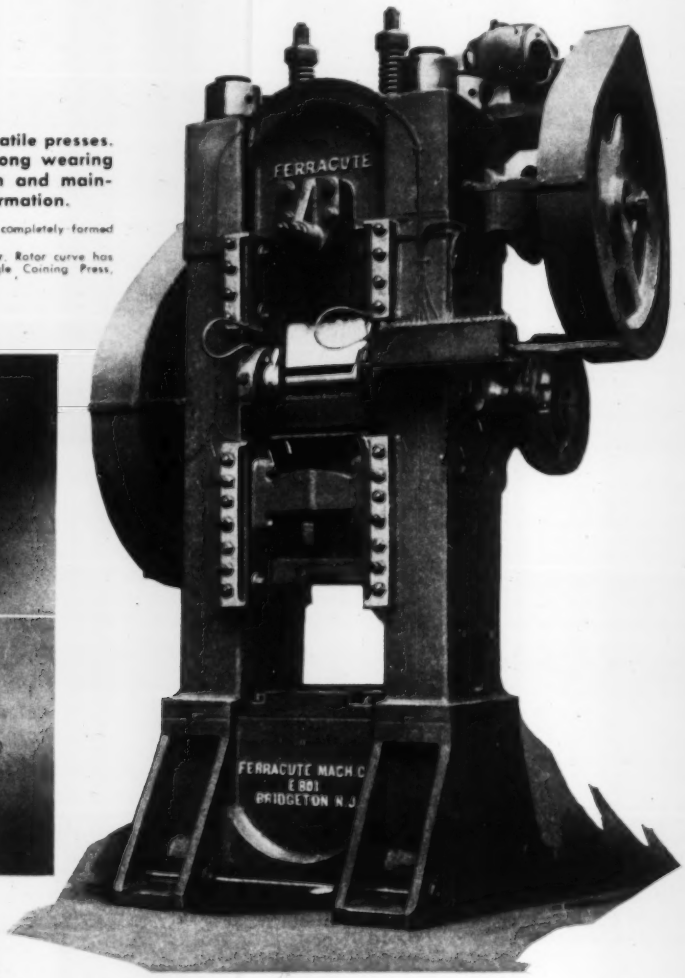
Top Figure—Jet engine turbine jet blade completely formed by Ferracute Toggle Coining Press.

Bottom Figure—Pole piece for a DC motor. Rotor curve has been coined to size by Ferracute Toggle Coining Press, saving expensive machining operations.





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cluding cast magnesium anodes used extensively to protect metal structures, underground pipe lines, steel piers, and ship hulls from corrosion; Galvoline, a cored magnesium ribbon for underground installation using cable laying plows; and cored magnesium rod for protecting hot water storage tanks from corrosion. H. A. Humble, manager of Dow's cathodic protection sales, is in charge of sale of these items and is assisted by R. L. Featherly.

C. F. & I. Buys Brooke Iron

Colorado Fuel & Iron Corp., Denver, acquired all the assets of E. & G. Brooke Iron Co., Birdsboro, Pa., and will operate the property as the E. & G. Brooke Iron Division.

Bausenbach Plans Expansion

A. E. Bausenbach Inc., Buffalo, producer of metal containers, applied to the government for a fast tax write off on a proposed $750,000 expansion of plant and equipment. The company says it needs more manufacturing space to handle a backlog of orders approximating $5 million.

Hewitt Forms Division

Formation of a South Central Sales Division, Hewitt-Robins Inc., New York, became effective Jan. 1. L. D. Bigelow is vice president in charge of Hewitt-Robins' Central Sales Division at Chicago while L. C. Holloman is assistant division manager in charge of the newly created division.

Dow Buys Building Site

Dow Chemical Co., Midland, Mich., acquired a 600-acre tract of land near Williamsburg, Va., as a possible future site for a plastics plant. The James river front location would permit delivery of raw materials by boat from Dow's Texas Division at Freeport, Tex.

Tool & Die Firm Organized

Southern Steel & Stove Co., Richmond, Va., organized the Southern Tool & Die Co. which will have facilities for the general manufacture of tools and dies. Southern Tool purchased certain tools and equipment from American Can Co. which discontinued operations in its Richmond plant.

Whitney Chain Builds Plant

Construction is progressing rapidly on the plant addition of Whitney Chain Co., Hartford, Conn. The addition contains about 10,000 square feet of floor space and is expected to be in use in several weeks. This area will be devoted to the manufacture of fabricated steel sprockets and large pitch roller and conveyor chains.

Will Use Vanderloy Process

Spar-Tan Engineering Co., Los Angeles, was licensed to use Vanderloy M iron plating process, product of Van der Horst Corp., Olean, N. Y.

Sprague Opens Dayton Office

Sprague Electric Co., North Adams, Mass., opened an application engineering office at 3 E. Second St., Dayton, O. William M. Lana will be in charge of the office.

Anthes-Imperial Buys Medina

Medina Iron & Brass Co., Medina, N. Y., will be sold to Anthes-Imperial Co. Ltd., St. Catharines, Ont. The new owners manufacture soil pipe and fittings in addition to steam boilers and air conditioning equipment.

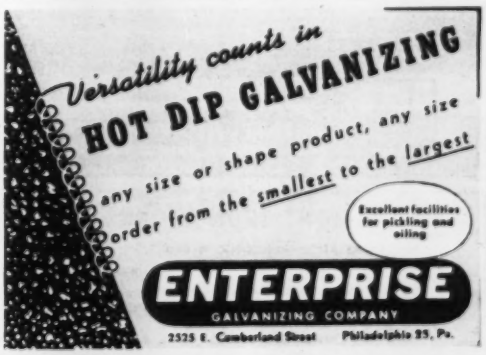
Chemical Firm Names Agent

Northwest Chemical Co., Detroit, appointed Johnson Sales Co., Montclair, N. J., as its representative in the middle Atlantic states.

Buffalo Tube Works Expands

General Electric Co.'s Buffalo Tube Works, Buffalo, is installing $500,000 worth of new equipment to boost output of television picture tubes. Output will be increased to 3000 tubes daily. A $500,000 warehouse build-

EXPLODED INTO PLACE: Using a cartridge-powered stud driver, a carpenter prepares to anchor a wooden sleeper to the floor of a new defense plant. Carpenters force wedges under the sleepers and surveyors check the level before installation in the six-story defense production plant of National Cash Register Co. in Dayton, O.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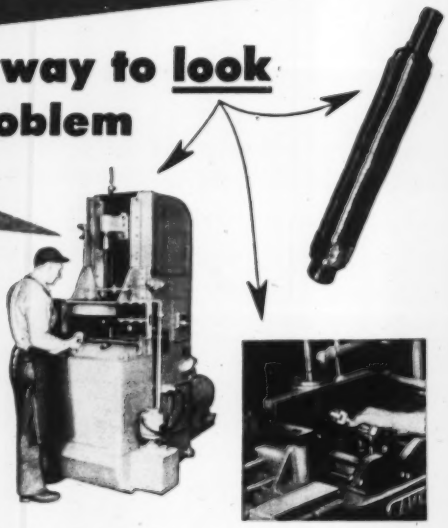

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ing has just been completed at the plant.

Chatco Steel Buys Building

Chatco Steel Products Ltd., Tilbury, Ont., will take over the factory building in Lindsay, Ont., formerly occupied by Allen & Hanbury Co., under a Chatco decentralization program. The move was made to be closer to outlets in Toronto and Montreal and because of more favorable wage rates.

Eclipse Moves To New Plant

Eclipse Fuel Engineering Co. moved into its new factory and office building on Buchanan street, Rockford, Ill. The plant, containing 95,200 square feet of space, represents an expansion to triple the plant's former quarters.

Joseph Absorbs Wolf & Co.

David J. Joseph Co., Cincinnati scrap broker, absorbed Wolf & Co., Hamilton, O. Mr. Wolf has been a vice president and active in the management of the Joseph company while conducting the business of his own company.

Holbrook Opens New Office

Tay Holbrook Inc., San Francisco, moved its Stockton, Calif., branch to 1234 S. Aurora St. A stock of furnaces, plumbing fixtures and accessories, pipe, valves, fittings and steel is maintained by this branch.

American Drill Expands

American Drill Bushing Co. Inc. added $150,000 worth of plant facilities at 5107 Pacific Blvd., Los Angeles.

Benchmaster Mfg. Co. Moves

Benchmaster Mfg. Co. moved to 1835 W. Rosecrans Ave., Gardena, Calif.

Magnethermic Appoints

Magnethermic Corp., Youngstown, appointed Walker & Seed Tool & Engineering Co., Cleveland, as sales representative for Michigan, northern Indiana and northern Ohio. Magnethermic manufactures low-frequency induction furnaces.

Price Fireplace Buys Plant

Price Fireplace Heater & Tank Corp., Buffalo, purchased New York Car Wheel Co.'s plant in Buffalo for about $1 million. New York Car Wheel will consolidate its operations with the Albany Car Wheel Co. in Albany, N. Y. Price Fireplace will continue operations in its present Buffalo plant but will use the Car Wheel plant for undisclosed defense production "in the steel welding field." Mr. Price said he expects to utilize the entire space of some 115,000 square feet in the Car Wheel plant. It has a large foundry, pattern shop and machine shop.

Jeffrey Forms New Division

Realizing the vast potential in the field of minerals beneficiation, Jeffrey Mfg. Co., Columbus, O., created an Ore Beneficiation Division with William H. Newton as manager. He will promote sale of the company's line of magnetic separators as well as allied equipment. The company also appointed Continental Sales & Equipment Co., Hibbing, Minn., as authorized distributor for Jeffrey products in that area.

Oklahoma Compressed Steel

Oklahoma Compressed Steel Corp., Tulsa, was granted a 50-year charter. Incorporators are Jim B. Forster, Pat Malloy and N. E. McNeill Jr.

Borman Engineering Formed

Borman Engineering Inc., 6872 Farmdale Ave., N. Hollywood, Calif., was organized to offer services in engineering and tool and die design, and construction of fixtures and experimental parts for aircraft. M. M. Borman is president.

Harvey Machine Buys Site

Harvey Machine Co., Los Angeles, purchased a 653-acre industrial tract west of Buena Park, Calif., for over $1 million. Purpose of the purchase was not announced.

Fine Organics Inc. Expands

Fine Organics Inc., New York, plans to enlarge buildings to house increased laboratory and production facilities at its Lodi, N. J., plant. Additional process equipment orders were placed also to enlarge the company's capacity to produce intermediate chemicals, pharmaceuticals and fine organics.

Central Plans Service Shop

Luria Engineering Corp., New York, will begin construction next month for the New York Central Railroad at Minoa, N. Y., of the fourth of a series of diesel locomotive service and repair shops. The shop will cover 48,800 square feet. Steel structure for the Minoa shop will be fabricated at Luria's plant in Bethlehem, Pa. Central's shops at Corning and Rochester, N. Y., are completed while the shop in Watertown, N. Y., will be completed soon.

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Advertisers in this Issue

Alliance Machine Co., The 82
Aluminum Company of America 14, 15
American Broach & Machine Co., A Division of Sundstrand Machine Tool Co. 120
Armco Steel Corporation 30
Atlas Washer Manufacturing Corp. 114
Avondale Marine Ways, Inc 111

Barium Steel Corporation 2
Belmont Iron Works, The 120
Bethlehem Steel Co. 1
Birdsboro Steel Foundry & Machine Co. 73
Bixby, R. W., Inc. 123
Bronze Die Casting Co. 121
Browning, Victor R., & Co., Inc. 120
Bullard Co., The 48

Carpenter Steel Co., The 106
Century Electric Co. 24
Chicago Electric Co. 122
Cincinnati Machinery Co., Inc. 123
Cleveland Steel Tool Co., The 120
Cleveland Worm & Gear Co., The Inside Back Cover
Copperweld Steel Co. 51
Crucible Steel Company of America 102
Cutler-Hammer, Inc. Back Cover

Dayton Rubber Co. 19
Dennison Engineering Co., The 7
Diamond Mfg. Co. 121

Eastern Machine Screw Corp., The 121
Eaton Manufacturing Co., Reliance Division 62
Electric Controller & Mfg. Co., The Inside Front Cover
Elgin National Watch Co., Abrasives Division 5
Enterprise Galvanizing Co. 119
Erie Enameling Co., The 115
Erie Foundry Co. 61

Federal Products Corporation 90
Ferracute Machine Co. 118
Firestone Steel Products Co. 33
Follansbee Steel Corporation 86
Foster, Frank B., Inc. 122

General Electric Co. 105
Goodyear Tire & Rubber Co., Inc., The 4
Gorham Tool Co. 12

Hartwell Brothers 117
Hendrick Manufacturing Co. 113

Iron & Steel Products, Inc. 122

Jackson Iron & Steel Co., The 120

Kaiser Steel Corporation 100
Kenilworth Steel Co., The 55
Kidde, Walter, & Co., Inc. 10

Landis Machine Co. 11
Lebanon Steel Foundry 115
Lee, K. O., Co. 117
Leeds & Northrup Co. 75
Link-Belt Co. 8
Lucas-Milhaupt Engineering Co. 110
Luria Brothers & Co., Inc. 94

McKay Machine Co., The 43
McKee, Arthur G., & Co. 77

Macwhyte Co. 3
Marchant, Geo. F., Co. 113
Mathews Conveyor Co. 116
Monarch Machine Tool Co., The 87
Murray, A. B., Co., Inc. 116

National Acme Co., The 9
National Steel Corporation 18

Oakite Products, Inc. 110
Ohio Locomotive Crane Co., The 121

Pawtucket Manufacturing Co. 6
Pittsburgh Lectromelt Corporation 44

Ready Tool Co. 119
Reliance Division, Eaton Manufacturing Co. 62
Republic Steel Corporation 21
Roebling's, John A., Sons Co. 13
Ryerson, Joseph T., & Son, Inc. 34

St. Joseph Structural Steel Co. 123
Sargeant & Wilbur, Inc. 124
Seaboard Steel Co., Inc. 122
Simonds Abrasive Co. 89
Standard Pressed Steel Co. 16
Steel Protection & Chemical Co., Inc. 117
Sundstrand Machine Tool Co., American Broach & Machine Co. Division 120
Superior Air Products Co. 93

Texas Co., The 26
Timken Roller Bearing Co., The, Steel & Tube Division 52
Tinnerman Products, Inc. 56
Transue & Williams Steel Forging Corporation 59

United Engineering & Foundry Co. 17

Warner & Swasey 20
Weirton Steel Co. 18
Werner, R. D., Co., Inc. 112
Westinghouse Electric Corporation 29
West Penn Machinery Co. 122
Wheland Co., The 116
Whitehead Stamping Co. 119
Wilkie Die Products Co. 122

Yale & Towne Manufacturing Co., The 79
Youngstown Sheet & Tube Co., The 25

Table of Contents Page 5

Classified Advertising Pages 122, 123

These are Cleveland vertical units in a stone preparation plant. They drive a feeder table which transfers crushed stone from storage bins above to a conveyor belt, on the way to kilns for dead burning.

Trouble-free CLEVELANDS drive dolomite feeder

SERVING day-in, day-out, these Clevelands help to keep the steel mills running. They contribute to the manufacture of dead burned dolomite—a refractory material with which open hearth furnace bottoms are maintained.

In metal production and fabrication, as well as in the wide spread supporting industries like this one, there are thousands of Cleveland worm gear speed reducers and worm gear drives—many of them in operation thirty years and more.

Since 1912, Cleveland has concentrated its entire engineering and manufacturing effort on a single product—worm gearing. It has always emphasized the four basic factors of correct design, finest quality materials, up-to-date manufacturing facilities and precision workmanship. As a result, wherever industry needs dependable drives—drives that will operate continuously under heavy loads, for long periods of trouble-free service—there you're likely to find Clevelands at work.

In or near your city there's a Cleveland engineer ready to serve you. He will be glad to discuss your power transmission problems and suggest proper drives to meet your particular needs. The Cleveland Worm and Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication.
In Canada: Peacock Brothers Limited.

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Speed Reducers

Choice of the Leaders

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MOTOR CONTROL
C-H

The Mark of Better Machines

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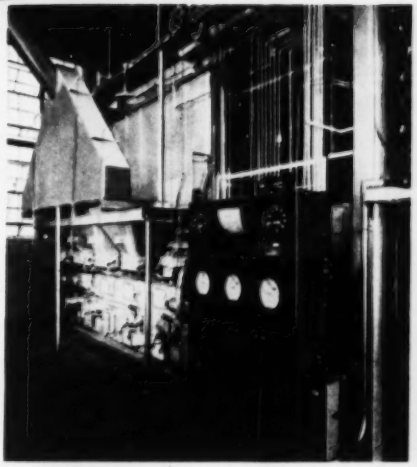

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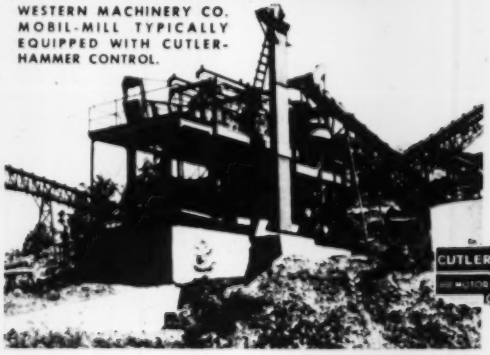
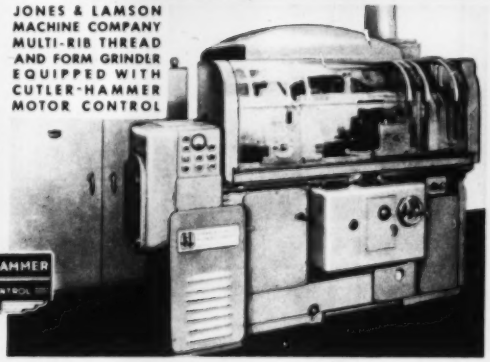


JONES & LAMSON MACHINE COMPANY MULTI-RIB THREAD AND FORM GRINDER EQUIPPED WITH CUTLER-HAMMER MOTOR CONTROL



Good, Better, Best...

There is no such thing as a *bad* product of any kind on the American market; competition is too severe for a poor product to exist. But there *are* degrees of merit. Some products are recognized as better than other products. And some few in every field are widely accepted as the *best*. Their makers are acknowledged leaders and their names have become buy-words for assured satisfaction. This position of commercial advantage is neither easily won nor held without a policy of scrupulous attention to every detail influencing product performance in the user's hands. In accepting this obvious fact no thinking person can fail to be moved by the force of the evidence that Cutler-Hammer Motor Control is so frequently and continuously the choice of the nation's leading machinery manufacturers. You too will find it pays to insist on Cutler-Hammer Motor Control . . . . . CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Limited, Toronto, Ontario.